JPRS-UST-85-006

6 May 1985

USSR Report

SCIENCE AND TECHNOLOGY POLICY

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USSR REPORT

SCIENCE AND TECHNOLOGY POLICY

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GENERAL

ORGANIZATION, PLANNING AND COORDINATION

PLANNING, STIMULATION OF DEVELOPMENT, PRODUCTION OF NEW EQUIPMENT

Moscow PRAVDA in Russian 4 Dec 84 p 2

[Article by Academician of the Kazakh SSR Academy of Sciences T. Ashimbayev, director of the Institute of Economics (Alma-Ata): "Stimuli of Research"]

[Text] The extensive introduction of the achievements of science and technology is the basis of the effective development of production. For this it is necessary to increase the scale of the introduction of advanced processing methods and the updating of products.

Given the present state of the planning of new equipment and the organization of its introduction the cost accounting interests of labor collectives often come into conflict with the need to accelerate scientific and technical progress. The point is that the introduction of innovations, especially large-scale ones, requires the reorganization of production and the rearrangement of the processing method. All this affects the previously set rhythm of production and for some period checks the fulfillment of the plan of the output of products. But this was and remains the main criterion of the evaluation of production activity.

Although at enterprises the technical, industrial and financial plan is unified, still the production plan and the plan on new equipment are clearly differentiated in it. The former plan as a whole is fulfilled and exceeded, the latter lags chronically. True, during the years of the 11th Five-Year Plan the level of its fulfillment has increased somewhat, but it is still a long way to complete success.

The difficulties with the assimilation of new processing methods, the lack of preparation of the conditions of their use and the search for not only financial resources, but also the necessary materials and equipment tell here. As paradoxical as it is, new equipment continues to remain "an unprofitable matter." Frequently it turns out that the manager, who has begun to introduce new equipment at his place, is the loser, while whoever shuns innovations, loses nothing.

The work in the sphere of scientific and technical progress in many ways is of a research nature, as a result of which the effectiveness of the work being

performed is not precisely specified and the possibility of risk is not ruled out. The risk is connected with the evaluation of the activity of enterprises on the fulfillment of the plan assignments and with the use of one form or another of material stimuli. In ministries and departments they put the fulfillment of the production plan in first place. This is also understandable, since it is necessary to be accountable for it to superior organs. As to the plan on new equipment, its upsetting is far from always taken into account.

Moreover, at times new equipment and technology turn such a face of theirs, that they hinder the fulfillment of the basic plan. The Semipalatinsk Accessories Plant serves as an example of such an approach to new equipment.

It is possible to produce in two methods its product--sealing rings. According to the first method they are cut on machine tools from brass tubing: half of the metal becomes chips, the expenditures of labor and power are significant. According to the second, more advanced method the rings are obtained unit by unit in special molds in electric furnaces. The plant is not opposed to the innovation, but has not been able to display enthusiasm for 4 years. Why?

"There is no time," as the managers explain. But the real reason is in something else: in case of the introduction of the new process the materials-output ratio decreases, which leads to the decrease of the volumes of output of products in rubles and, consequently, the production plan cannot be fulfilled. For the amounts of the bonuses for new equipment are significantly less than for the overall indicators of production.

The preference, which is given at enterprises to the fulfillment of the production plan over the plan on new equipment, signifies in essence the opposition of current and long-range interests. Here they literally are forgetting that the introduction of new equipment "works" for subsequent years and lays a strong foundation of the future benefits, which production collectives will receive.

It is obvious, it would seem, that it is necessary to give preference to long-range interests over current interests. But this depends entirely on economic thought. But it is formed to a decisive extent by planning, by its aim. So that enterprises would be faced with the need to "rely" on new equipment, it is necessary at least to combine current interests with long-range interests. For this the role of the plan assignments on new equipment should be increased, new impetus should be given to them. This, in my opinion, is possible on the following conditions.

It is necessary to examine the plan on new equipment in fundamental connection with the production plan and to take into account the level of its fulfillment when evaluating the activity of enterprises, associations and ministries. How? The fulfillment of the plan of the output of products should be adjusted with allowance made for the fulfillment of the plan on new equipment. And subject to this the amount of the economic stimulation funds and the sizes of the bonus awards should be determined. In other words, in this way the

assignments on new equipment can be incorporated in the rank of evaluation and fund-forming indicators.

An important provision in this respect is contained in the decree of the CPSU Central Committee and the USSR Council of Ministers on measures on the acceleration of scientific and technical progress in the national economy. It is established in it that the fulfillment of the plans and assignments on the development of science and technology are included among the most important indicators.

However, the inertia of the past has not yet been overcome, the technical level of production remains outside the categories of specific evaluation indicators. Management personnel, as before, receive bonuses in the full amount for the basic results of economic activity. But at times this is nothing other than bonuses for a future lag.

The radical increase of the role of the plan on new equipment, in my opinion, is directly connected today with the economic experiment. In accordance with the conditions of its conducting the number of approved evaluation indicators is being decreased. At the same time the basic assignments on the development of science and technology and the implementation of scientific and technical programs have been introduced among them. I completely agree with the article "Plans With a Dotted Line" (PRAVDA, 20 April): it is very important to include these assignments in the products list plan of production. The first prototypes and industrial series will fundamentally link the plans on new equipment with the production plans. Precisely such an approach in planning aims enterprises at the acceleration of scientific and technical progress.

The fundamental interlinking of the plans of production and new equipment should, it seems, occur in two directions. The plan on new equipment will gradually constitute the reference base of the formulation of the industrial and financial plan of enterprises and be aimed at the improvement of the structure of expenditures. Here it is important that the expenditures on the introduction of new equipment and the impact from it would receive clear reflection in the balance sheet of revenues and expenditures.

How is it best to do this? In the well-known decree on the improvement of the economic mechanism it is envisaged to introduce in planning practice a new indicator--"the economic impact from the implementation of scientific and technical measures." This indicator so far has not found use. As before, economic efficiency is not planned. This makes it possible to include in the plan insignificant measures and leads to the decrease of efficiency. The tendency to report only the number of enterprises, which do not have at times specific qualitative parameters and in essence do not influence the end results of production, is very tenacious. Reasonable corrections are needed here. Precisely what kind?

The planning of the indicator of the economic impact from new equipment makes it possible to overcome the purely quantitative approach to innovations and to reflect in the revenue portion of the balance sheet of enterprises the amount of the anticipated real profit from the use of scientific and technical achievements and in its expenditure part the expenditures on their

introduction. By comparing the latter with the impact, it will be easy to calculate the profitability of technical decisions.

The need has also arisen, it seems, for the changeover to "graduated" prices subject to the level of obsolescence or novelty of equipment. The point is that it is necessary to set the prices for new equipment for a specific period, which coincides approximately with the time of the onset of obsolescence. This is one level of prices. After the expiration of this time the prices are reduced to the second level, and then, after approximately 3 years, a new reduction is envisaged, which will force the enterprise to remove obsolete products from production and to update the products list.

Of course, one must not automatically apply the prices "for a certain time." If some equipment or other meets present requirements, it is necessary to retain the initial prices. It is also possible to act in a similar manner if the equipment is modernized in good time with the appreciable improvement of its parameters.

But let us return to the bonuses. The workers of enterprises are paid bonuses mainly for the achieved overall results. For the fulfillment of the production plan--from the material incentive fund, for new equipment--from a special fund having a special purpose. The former fund is large, which you would not say about the latter.

At present the payment of bonuses from these sources is carried out autonomously. This principle was introduced in the 1960's and retains its force to this day. But if we speak more precisely, it displays impotence. In my opinion, it does not conform to the present conditions if only because it breaks the unity of the "production--new equipment" chain and separates the overall indicators of production from new equipment and the latter from the end results. All this relaxes the attention of production workers to scientific and technical progress.

In the country there are many enterprises, at which the bonus payments from the material incentive fund are increasing in case of the chronic nonfulfillment of the plan on new equipment. But since they fulfill the sales plan, millions of rubles of bonuses have been paid to them. It is hardly possible to consider such a situation normal. Already today many plants due to the contempt for scientific and technical progress are not coping with the plan of the increase of labor productivity.

In my opinion, it is necessary to stimulate personnel, especially managerial personnel, first of all on the basis of what real impact new equipment yields and how it influences the end results of production.

What is needed for this? It is necessary to combine the bonus fund for new equipment with the material incentive fund. To adjust the amount of the deductions for this fund according to the prevailing indicators subject to the level of fulfillment of the plan on technical development and to increase it in proportion to the impact, which is obtained by enterprises from the use of

scientific and technical achievements in production. For production itself and its equipment are a unified integrated process which is aimed at the end results.

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CSO: 1814/67

ORGANIZATION, PLANNING AND COORDINATION

NONTRADITIONAL METHODS OF DEVELOPING SCIENCE, TECHNOLOGY

Moscow KOMSOMOL'SKAYA PRAVDA in Russian 20 Nov 84 p 2

[Article by Corresponding Member of the USSR Academy of Sciences I. I. Nesterov, director of the West Siberian Scientific Research Institute of Exploration of Geology: "The Right to a Discovery"]

[Text] Recently a report spread through our and the world press: a bacteriological preparation, which makes it possible to eliminate effectively the consequences of the contamination of the environment with petroleum product wastes, had been developed in Tyumen. Its tests at the fields of Nizhnevartovsk and Nefteyugansk yielded a quite good result.

In recent years there have been quite a number of discoveries of this sort at the ZapSibNIGNI [West Siberian Scientific Research Institute of Exploration of Geology]. And the bacteriological preparation, which was developed by young scientists of the microbiological laboratory, is just one of the proofs: all the subdivisions of the institute are working efficiently, to good effect, at a high scientific level.

Quite recently the people of Tyumen could only dream of such a level. Incidentally, not only the people of Tyumen. What scientific institution would refuse to organize its work so that discoveries would be put "on stream"?!

But here is the paradox: they are refusing. Rather, it is as follows: they would not refuse, if serious obstacles did not stand in the way of the introduction of a new form of the planning and organization of science.

Was it not these obstacles which General Secretary of the CPSU Central Committee and Chairman of the Presidium of the USSR Supreme Soviet K. U. Chernenko had in mind, when he spoke at the last meeting of the Politburo of the Central Committee about the fact that the state of affairs in the

area of the development of science and technology is arousing definite anxiety?

With enormous difficulty Corresponding Member of the USSR Academy of Sciences I. Nesterov, director of the West Siberian Scientific Research Institute of Exploration of Geology, "breached" the idea of the practical implementation of the goal program planning of scientific research. For the time being on the scale of his own institute. But 3 years have already passed since the beginning of the experiment. Is it not time to disseminate the experience gained in Tyumen on the scale of the sector and the entire national economy? I. I. Nesterov has the floor.

V. Grannik
(Our correspondent)

In science originality and a nonstandard way of thinking have always been valued. Owing to such an approach the Tyumen petroleum was discovered. But why does it turn out this way: The authors of original ideas, before receiving recognition, initially receive lumps? Because they go "against the current" and fixed views. The point is that the traditional organization of scientific research in general poorly stimulates "unexpected moves" and as if legitimizes the conservatism of thinking.

Is it possible to legitimize its right to dare?

It is possible. But for this it is necessary to reject the obsolete principle of the planning of science by themes. For each of them is approved at the level of the ministry and is designed for 2-4 years, and within these time limits any change of the theme is an also insoluble problem.

In research there is also not enough flexibility because the subdivisions even within one scientific research institute work as if having shut themselves off from each other, autonomously. Meanwhile discoveries most often lie at the boundaries between scientific directions. But what kind of boundary is there, if a structural geologist "does not understand" a physicist?

There is a way out. It is necessary to move away from the goal. To take as a basis a large strategic task, a major national economic problem and at the beginning of the path to aim at its solution the efforts of all the subdivisions. Every theme will play the role of a "subsidiary" theme. But this will not decrease its scientific importance--on the contrary, it will increase it. Organizationally this should look as follows: the ministry approves for the institute for the five-year plan not 250-300 themes, but 15-20 programs. How their fulfillment will proceed and which themes should be within the program are an internal matter of the scientific research institute.

Such was the idea which originated at our institute. We turned with specific proposals to the ministry. The minister approved of them. We began the formulation of the programs. But the USSR State Bank cooled our ardor: for

no one had repealed the old instructions, in accordance with which only themes are financed.

It was possible with much difficulty, but all the same to overcome this obstacle. They made an exception for the West Siberian Scientific Research Institute of Exploration of Geology. As of 1981 the experiment on goal program planning at the institute was granted civic rights.

The experiment immediately "struck" the themes which had not worked for the common goal. Several of them were cut off. Previously, even under the conditions of total lack of promise, their "unsinkability" was ensured for years ahead by the planning dates, which the institute could not influence.

The results of the experiment cannot but give pleasure: the intensity of scientific research at the West Siberian Scientific Research Institute of Exploration of Geology increased by approximately threefold! This means: every scientific associate of the institute is doing the work of three people. By means of what?

Previously only the supervisor of the theme was responsible for it. While the others in most instances were forced to yield to his authority. Moving on such a "scientific leash," it is difficult to display independence.

Everything changed with the introduction of goal program planning. What happened in connection with this can be called a surge of independence. Both associates, who up to then played secondary roles, and yesterday's graduates of higher educational institutions, who were entirely beginners, became responsible coperformers and coauthors of scientific works.

One of these "discoveries" is the young specialist Konstantin Svetlov from the Sector of the Study of Wells of the Industrial Geology Department. Prior to 1981 he had already worked several years at the institute and was not distinguished for anything special. The fulfillment by him of an important special-purpose assignment became the first truly independent section of work. During the defense in the scientific council his capabilities as a researcher were appreciated at their true value.

Volodya Kozyrev had worked only a year in the Sector of Ground Water Resources of the Hydrogeology Department after graduating from the Tyumen Industrial Institute. At another scientific research institute a young specialist can dream for years about what he managed to do in this time.

An enviable start in science, from the first steps is its own path in it. It is very difficult to fulfill a special-purpose assignment, hence, whether he likes it or not the supervisor should also be concerned about the growth of the young associate and about adding to the stock of his theoretical knowledge. The ever increasing difficulty of assignments also relentlessly urges on the specialist himself: if you mark time, you will fall behind. But, no, they will not allow it: at the institute a rule is in effect--one of the basic directions of geological science is attached to each scientific associate. No one at the West Siberian Scientific Research Institute of Exploration of Geology, for example, is surprised that more experienced

colleagues also turn for advice to the young specialist Nikolay Zmanovskiy, when it is a matter of tectonic processes of the earth.

The monitoring of the creative growth of the specialist at the institute is many-sided. A great help here is the Karpov system of socialist competition, when the wage is differentiated subject to the efficiency of the labor of each person.

Stimulation by the ruble is supported by social control. The Komsomol Committee, for example, keeps every trainee in its field of view. At the end of the year the mentor of the young specialist reports back to the council of young scientists and specialists or to the youth section of the scientific council. In accordance with the results of the probation the Komsomol Committee can petition before the administration for the promotion of the young specialist.

Thus, planning in accordance with comprehensive goal programs at the West Siberian Scientific Research Institute of Exploration of Geology yielded a considerable impact. The institute came out among the leading ones in its sector, they are holding it up as an example. Now if we could rest on our laurels and receive our challenge banners, certificates and bonuses. But the thought: the changeover of one institute to new planning is only the first step, and a very small one, gives us no peace. The task of the complete development of the resources of the Tyumen North is posing such major, many-sided problems, which it is necessary to solve with the participation of many, many scientific institutions of the country.

Precisely for this reason the collective of our institute greeted with such satisfaction the announcement of Comrade K. U. Chernenko at the last meeting of the Politburo of the party Central Committee that at the next Central Committee plenum the questions of the acceleration of scientific and technical progress and the improvement of its management in all the units of the economy will be examined. The need for such a major discussion was ripe long ago. It has long been time to grant scientific institutions the freedom of scientific research and to remove the barriers which prevent scientists from working efficiently, to full effect.

Scientific integration on the basis of larger and larger regional programs will yield an enormous national economic impact. We are proving our case by specific examples. Here is one of them. When the question of the development of Urengoy was on the agenda, the young scientists of the West Siberian Scientific Research Institute of Exploration of Geology came forth with the initiative to set up an intersectorial creative youth collective for the drafting of a comprehensive plan of the development of the deposit. The collective was formed. The Urengoy Special Staff attached to the Tyumen Oblast Komsomol Committee coordinated its work. As a result there is a dazzling success: the program was fulfilled, its introduction provided an economic impact of about 40 million rubles.

But, on the other hand, the young people proved: effective scientific integration on the scale of the country is possible and necessary. The decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures

on the Acceleration of Scientific and Technical Progress in the National Economy," in which the possibilities of temporary creative scientific collectives are spoken about, aims directly at such integration. But today there are too many obstacles in the way of the realization of these possibilities. Do not change all science over to a public basis! Planning and financial organs have the last word: it is time to spread the know-how of the Tyumen scientific research institute at other institutes as well. And then they will be able to solve complicated problems together.

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CSO: 1814/67

ORGANIZATION, PLANNING AND COORDINATION

UKRAINIAN PARTY SEMINAR ON SCIENTIFIC, TECHNICAL PROGRAMS

Kiev PRAVDA UKRAINY in Russian 19 Dec 84 p 3

[Article: "Accelerate the Development of a Set of Scientific and Technical Programs"]

[Text] A full year of intense labor on the completion of the current five-year plan is still ahead. But it is already necessary today to think about that, with which the republic will enter the next 5-year period and in what way the increase of its contribution to the development of the unified national economic complex of the country and the acceleration of the pace of scientific and technical progress will be ensured. On the basis of the experience of the goal program planning and management of scientific and technical progress, which has been gained in the country and the republic, the decision was made to begin the formulation for the 12th Five-Year Plan of a unified interconnected set of programs.

The seminar, which was held on 18 December in the Ukrainian CP Central Committee, was devoted to this question. Members and Candidate Members of the Politburo of the Ukrainian CP Central Committee Ye. V. Kachalovskiy, B. V. Kachura, I. A. Mozgovoy, A. A. Titarenko, Yu. A. Kolomiyets and V. D. Kryuchkov, as well as Deputy Chairmen of the Ukrainian SSR Council of Ministers S. I. Gurenko, K. I. Masik and N. F. Nikolayev, President of the Ukrainian SSR Academy of Sciences B. Ye. Paton and responsible officials of the Ukrainian CP Central Committee, the Ukrainian SSR Council of Ministers and the republic State Planning Committee took part in its work.

The directors of working groups of the councils for the promotion of scientific and technical progress attached to the oblast party committees and responsible officials of the republic ministries and departments, the oblast planning commissions, the scientific centers of the Ukrainian SSR Academy of Sciences and their scientific coordinating councils by fields were invited to the seminar.

As Politburo Member and Second Secretary of the Ukrainian CP Central Committee A. A. Titarenko noted in the welcoming address, people, who are immediately involved in the formulation of scientific and technical programs for the 12th Five-Year Plan and are directly responsible for the organization and effectiveness of this work in the republic, had gathered. They had gathered

in order to come to an agreement on a unified, coordinated approach to the direction and the method of formulation of the programs, their structure and coordination with the plans and to the choice of the measures, which should be included in them.

Seven all-republic programs: "Labor," "The Energy Complex," "The Agricultural Complex," "The Materials-Output Ratio," "Metal," "Transport" and "Biotechnology," should become the basic core of the system of the goal program management of scientific and technical progress, which is being formed in the republic. Programs, which are, on the one hand, the continuation and specification of all-republic programs and, on the other, a reflection of the specific nature of each sector and region and the peculiarities of their scientific and technical potential, are being developed at the sectorial and oblast levels of management.

In the speech it was stressed that the decisive criterion when choosing the measures for the programs of all levels and when determining their structure and the priorities in the supply with resources should be the degree of their real influence on the key indicators of management: the increase of labor productivity, the decrease of the product cost, the improvement of the quality of the items being produced. All the republic programs should contribute to the mobilization of forces for the successful implementation of the imposing plans of our party and the instructions of General Secretary of the CPSU Central Committee Comrade K. U. Chernenko and to the rapid fulfillment of the Energy, Food and Reclamation Programs of the country.

The task was posed to increase resolutely the degree of the economic analysis of the programs, to carefully analyze and calculate what resources will be required for the implementation of all the measures envisaged in them and what this will yield for the increase of the efficiency of the economy. The programs should play an important role in the drive for the saving of resources and in the assurance of operation 2 days a year on the saved materials, raw materials and fuel.

Having dwelled on the need for the increase of the economic skills of specialists and managers of all levels, A. A. Titarenko stressed that the republic ministries and departments should study this problem thoroughly and specify measures for its timely and complete solution.

Attention was directed to the need to ensure the extensive circulation, dissemination of the innovations being introduced in production as an indispensable condition of the sharp increase of the economic effectiveness of developments and their influence on the pace of scientific and technical progress on the scale of sectors and the national economy as a whole.

One should resolutely put a stop to the attempts, which are appearing in some sectors, to develop such programs, in which somewhat fewer new scientific developments would be included, and confine oneself only to operations which have been performed in one's own sector.

Special emphasis was placed on the periods of the formulation of programs. It was emphasized that they will be able to play a leading role and to accelerate

and direct scientific and technical progress only if they are formulated with a significant lead of the plans, if the assignments are transferred from the goal programs to the national economic plan, and not vice versa.

In conclusion A. A. Titarenko noted that during the next five-year plan it is necessary to fully adopt the approaches to the management of the formulation and implementation of programs, which have completely justified themselves during the current five-year plan. Among them is the principle which consists in the fact that at every level of management--republic, sectorial and oblast--there should be a comparatively small number of programs. This makes it possible to make personally responsible for their formulation and implementation people who have sufficiently broad powers: the deputy chairmen of the Council of Ministers in the republic, the deputy ministers in the sectors, the secretaries of the oblast committees and the deputy chairmen of the oblast soviet executive committees in the oblasts.

The active participation of the party committees and their councils for the promotion of scientific and technical progress in the formulation and the organization of the fulfillment of the programs, which has confirmed its effectiveness and viability in recent years, will also be continued.

In the report at the seminar Deputy Chairman of the Ukrainian SSR Council of Ministers S. I. Gurenko reported on the progress of the implementation of the scientific and technical programs of the current five-year plan and described in detail the specific goals and the structure of the set of comprehensive scientific and technical programs for the 12th Five-Year Plan, which is being formulated in the republic.

President of the Ukrainian SSR Academy of Sciences Academician B. Ye. Paton devoted his report to the questions of the prediction of scientific and technical development and the formulation of the Comprehensive Program of the Acceleration of Scientific and Technical Progress in the Ukrainian SSR to 2010.

V. F. Leont'yev, chief of an administration of the USSR State Committee for Science and Technology, and the directors of the working (expert) groups for the formulation of the republic programs: First Deputy Chairman of the Ukrainian SSR State Planning Committee V. P. Fokin (the "Labor" Program), Ukrainian SSR First Deputy Minister of Power and Electrification A. V. Gritsenko (the "Energy Complex" Program), First Deputy Chairman of the Ukrainian SSR State Planning Committee V. P. Popov (the "Agricultural Complex" Program), Vice President of the Ukrainian SSR Academy of Sciences and Academician of the Ukrainian SSR Academy of Sciences I. K. Pokhodnya (the "Materials-Output Ratio" Program), Chief of the Ferrous and Nonferrous Metallurgy Department of the Ukrainian SSR State Planning Committee I. N. Avramenko (the "Metal" Program), Chief of the Transport and Communications Department of the Ukrainian CP Central Committee A. Z. Khomich (the "Transport" Program) and Corresponding Member of the Ukrainian SSR Academy of Sciences V. V. Smirnov, director of the Institute of Microbiology and Virology imeni D. K. Zabolotnyy of the Ukrainian SSR Academy of Sciences (the "Biotechnology" Program), spoke at the seminar.

Two sections--on questions of the formulation of regional (oblast) scientific and technical programs and on sectorial programs--also worked. Secretary of the Dnepropetrovsk Oblast Committee of the Communist Party of the Ukraine A. A. Mironenko, Chairman of the Donetsk Scientific Center of the Ukrainian SSR Academy of Sciences and Academician of the Ukrainian SSR Academy of Sciences N. G. Chumachenko, Ukrainian SSR First Deputy Minister of Ferrous Metallurgy S. T. Pliskanovskiy, Chief of the Consolidated Department for Science and New Technology of the Ukrainian SSR State Planning Committee V. P. Shevchenko and other seminar participants spoke at the section meetings. An exchange of work experience took place.

The seminar participants were given the necessary guidelines and procedural materials for the immediate launching in the full amount of the work on the formulation of the scientific and technical programs for the 12th Five-Year Plan.

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CSO: 1814/67

ORGANIZATION, PLANNING AND COORDINATION

TECHNICAL PROGRESS AT NOVGOROD KOMPLEKS PRODUCTION ASSOCIATION

Moscow EKONOMICHESKAYA GAZETA in Russian No 49, Dec 84 p 17

[Article by Anatoliy Aleksandrovich Nesterov, general director of the Novgorod Kompleks Production Association, in the column "The Director's Platform" (Novgorod): "By the Routes of Technical Progress"]

[Text] The Novgorod Kompleks Production Association is an important supplier of advanced equipment. Its products enjoy a great demand both in our country and abroad. A. A. Nesterov, general director of the association, tells about the problems of increasing the technical level of items.

Anatoliy Aleksandrovich Nesterov worked as a brigade leader, shop chief, chief engineer and director of a number of enterprises. He graduated from a correspondence polytechnical institute without leave from work. Since 1972 he has been the general director of the Kompleks Association.

"The peculiarity of the present moment," as Comrade K. U. Chernenko noted in a speech at the meeting of the Politburo of the CPSU Central Committee, "consists in raising all work to a qualitatively higher level and in encompassing by rationalization all the units of the production process." The fundamental directions of the further intensification of production have been precisely and clearly specified: the saving of material resources, the efficient use of labor, the improvement of product quality, the extensive introduction of the achievements of science and technology, the improvement of the economic mechanism.

I believe that these tasks can be accomplished most efficiently within an association. Associations have indisputable advantages, if they are organized not by the simple merging of various enterprises, but comprehensively--with a scientific and technical, a machine building and tool bases, and are specialized in the processing method and products. Only such an association is capable of successfully developing the direction of technology, which has been attached to it.

The developed production scientific and technical base, which has been created at our association, is specialized in the development of new items, advanced

technology and automated equipment, including automatic lines, robotized complexes, NC machine tools, means of automatic control and other equipment.

In the 12 years of existence of the association the production volume has increased by 4.4-fold, the output of consumer goods has increased by threefold. Export deliveries have increased by several times. The systematic updating of production and the improvement of its technical base in many ways contributed to the achievement of these results.

Problems of Renovation

I will immediately specify that renovation is, perhaps, the most difficult period in the life of an enterprise. Whoever undertakes the assimilation of a new promising product or the renovation of production, finds himself in a disadvantageous position. For during the period of the implementation of these measures, as a rule, the production indicators worsen.

We, for example, are renovating one of the plants in accordance with a plan which was developed at the association. In carrying out the renovation, we are replanning the basic shops, many of them are being transferred to new areas and are being refitted with advanced equipment.

In order to robotize the stamping shop of the main enterprise, it was necessary to dismantle the equipment, pour new bases, install presses, robots and storage units. The transformer assembly shop was moved to another building and was completely retooled. All this had to be done without halting production in the operating shops.

In this case losses are inevitable. For it is necessary to work according to temporary flow sheets with the disruption of transportation flows, the indicators worsen somewhat. Not by chance are their managers who believe that it is more profitable to leave everything as it is, without undertaking reorganization while in operation.

The enterprises, which do not assimilate new items and do not take up renovation, find themselves for some time in a more preferable situation and take top-level places in the competition.

Such "success" in the end turns into a loss of the rate of the updating of the output being produced and the increase of labor productivity. Renovation is the most effective and rapid means for the development of production under present conditions. And it is necessary to plan it on the same level as the basic indicators.

The existing system of planning, unfortunately, does not solve these problems, and often hinders them. It is time to elaborate and introduce in the national economy a system of planning, which would take into account and stimulate the assimilation of new items and the renovation of enterprises.

The advantages of renovation appear subsequently not only in the increasing production volumes and the increase of labor productivity, but also in the improvement of the quality of items. We, for example, are responsible in the

sector for the technical level of transformers for household electronic equipment. I can say with full responsibility that at present our developments, processing methods and equipment are not inferior to the best foreign analogues, while in the production of magnetic circuits we hold the leading position.

Given the present rate of development of industry it is especially important to see the prospects, to outline correctly the main directions of technical progress into order to concentrate the basic forces in good time on the decisive sections. These questions, in my opinion, should constantly be in the purview of the manager and take up a large portion of the time of the general director.

In order not to miss the prospects, the general director should be in charge of the scientific and technical base of the association and be its direct chief. On this condition, as practical experience shows, new technical achievements: computer-aid designing, robotics, powder metallurgy, highly productive equipment with control from minicomputers and microprocessors, which are the basis for the development of versatile automated sections, shops and works, are introduced significantly more rapidly.

Promising Directions

A plan of retooling for the 12th Five-Year Plan is now being formulated at our association. We are incorporating in the basis specialized automatic lines with built-in means of control, which are already under development, NC equipment, robotized assembly complexes, which are controlled from minicomputers, and modules of versatile automated production systems for the basic types of production.

Since the beginning of this five-year plan more than 350 industrial robots and over 100 units of automatic service equipment have been developed and introduced at the association.

Now manipulators are performing the bulk of the stamping operations at all the enterprises of the association. A robotized shop and several separate robotized sections are in operation. We are constantly broadening the sphere of use of robots. In addition to stamping sections, a self-adjusting robotized section for the checking, inspection and packing of magnetic circuits and a section for the checking and inspection of transformers have been set up.

Departmental isolation, which hinders the use of advanced technical achievements, which leads to the lengthening of the time of introduction, is still an urgent problem for everyone who is involved with the development and introduction of new equipment.

When developing new equipment, we are forced to make practically everything--from the electric drive to the control system, and frequently even pneumatic and hydraulic equipment and industrial rubber items. This is due, first, to the lack of centralized deliveries of many component assemblies and parts, in

spite of the fact that specifications and state standards exist for them. There is also no centralized delivery of many standard items (rings, fasteners, electric wiring parts, coupling equipment for hydraulic and pneumatic units). Second, many components are of extremely low quality and in their parameters are far from the foreign analogues.

The need for the development and assimilation here in production of such assemblies and parts lengthens significantly the time of the designing and production of new equipment. For example, significantly more time is being spent on a specialized coil-winding machine than at foreign firms.

The Role of the Engineer

Under the conditions of the occurring scientific and technical revolution the role of engineering labor is increasing. Everything that is produced by industry, from the simplest items to spacecraft, is a result of creative engineering labor. We are doing much here in order to increase the output of engineers. The network planning of the most important developments, the daily planning and accounting of the operations performed by designers and the introduction of a computer-aided design system significantly increased their productivity.

However, the existing system of the drawing up of documents, the practice of various consultations on the use of materials, purchased items and component items, which is spreading more and more, the established procedure of approving and reapproving the specifications and the frequent change of standards are not increasing, but are decreasing the proportion of creative labor in the balance of working time of the specialist.

The problems of the maximum simplification of the development and delivery of new items to production and the reduction to a minimum of the number of standard technical documents urgently require their solution.

The development and strengthening of the experimental base of developers is a decisive factor in the acceleration of scientific and technical progress. In order to ensure the high quality of the items being produced and the automation of production, it is necessary to have high-precision special technological equipment, first of all metalworking equipment.

The policy of the intensification of production, which has been adopted by our party, requires of the developers of new equipment concerted and coordinated work in all the directions of scientific and technical progress.

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ORGANIZATION, PLANNING AND COORDINATION

REGIONAL MANAGEMENT OF SCIENTIFIC, TECHNICAL PROGRESS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 9 Jan 85 p 2

[Article by B. Burkinskiy, director of an affiliate of the Institute of Economics of the Ukrainian SSR Academy of Sciences (Odessa): "With Allowance Made for the Possibilities of the Region"]

[Text] In the present economy, in which questions of intensification, the increase of the technical level of products and the retooling of enterprises are beginning to play a decisive role, among the fundamental problems there has been posed the problem: In what direction is the management of scientific and technical progress to be improved? In recent years it has been solved by analogy with the management of production, the basis for which is the sectorial principle. But today it has already become clear that such an approach far from always promotes the mobilization of the reserves of the national economy.

In the sphere of scientific and technical progress this question is becoming especially urgent. In contrast to stable production with its strict relations between suppliers and consumers, this sphere is distinguished by considerable uncertainty because it relies on an extensive search for new solutions. Having embarked on the updating of products, renovation and retooling, enterprises are beginning to interact with numerous scientific research institutes, design bureaus and planning institutes. Here the sectorial approach frequently gives rise to paradoxical situations: the simplest problems, which can be solved by the forces of a neighboring higher educational institution or a scientific research institute of another department, are entrusted to organizations which are located hundreds, or else thousands of kilometers away. When solving these problems the possibilities of intersectorial cooperation on the regional level are also used poorly.

In several regions they are attempting to draft their own plans of scientific and technical progress. But for the most only only in order to fill the gaps between the sectorial plans. A common situation is characteristic of such planning: in the republics they bring together the assignments of the ministries and departments of republic subordination, in the krays and oblasts--only what has been planned in the sphere of scientific and technical progress by the enterprises which are subordinate to the local soviets.

It seems that for the purpose of accelerating scientific and technical progress the need has arisen to increase the role of planning on the level of regions, having made it equal in rights with sectorial planning. The experience of Moscow, Leningrad, Krasnoyarsk, Donetsk and other industrial centers, where in recent years they have taken the path of formulating and implementing regional programs, confirms the legitimacy of such a statement of the question. In most instances they are an attempt to generalize the sectorial plans of enterprises, scientific research institutes and design bureaus, construction and transportation organizations and to ensure their fulfillment by the exchange of experience and technical solutions and by creative cooperation. Although the methodological basis of these programs is far from perfect, at this stage they are nevertheless helping local party and soviet organs to actively influence the pace of the introduction of the achievements of science and technology, the assimilation of new types of products and the renovation of works.

The people of Odessa in particular have been convinced of the positive role of regional programs on the basis of their own experience. The collective of the Odessa Kislorodmash Scientific Production Association of the Ministry of Chemical and Petroleum Machine Building, to which the Avtogenmash Plant and the Scientific Research Institute of Technology of Cryogenic Machine Building belong, commenced the research in this direction. Back during the last five-year plan in cooperation with a number of academic and sectorial institutes of the region they began here systematic work on the saving of metal by the improvement of the design of the machines being produced, the introduction of advanced processing methods and the improvement of production management. The goal was to obtain the entire increase of output by means of the saved metal.

The Ukrainian CP Central Committee approved of this initiative, after which the subprogram "The Saving of Metals and the Increase of the Efficiency of Their Use at Enterprises of Machine Building and Metalworking," which was designed for a 5-year period, was formulated in the oblast. It became a component of the regional program "Machine Building," in the implementation of which the role of the main organization was assigned to the Kislorodmash Scientific Production Association. The dissemination of the experience and the methods of work of the association on the saving of metal among all the participants in the subprogram was its first task.

In the process of this work many technical, economic and organizational problems were solved, the documents for the system of control of material resources were developed and made more specific, its mass introduction was begun. As a result the 50 Odessa enterprises, which were covered by the subprogram, during the years of the current five-year plan have saved 43,700 tons of metal, having obtained an economic impact of 7.5 million rubles. This experience has made it possible to begin the formulation of an oblast program which is aimed at the saving of resources in all spheres of management.

There are many such spheres, in which the regional management of scientific and technical progress is making it possible to increase production efficiency significantly. Thus, on the basis of the central administrations of founding it is possible to carry out the centralized production of castings at all

interested enterprises. The development of a data bank on commercial waste products and secondary resources and the organization of their use are within the capability of the territorial administrations of the State Committee for Material and Technical Supply. The question of the establishment, for example, under the auspices of these administrations of enterprises for the production of accessible products for intersectorial use, as well as centers for the strengthening of parts and tools is also ripe.

Academic and sectorial institutes and higher educational institutions with research laboratories are located in the krays, oblasts and large industrial centers. Frequently they work on similar tasks, which are connected, for example, with the automation of production, the introduction of computer technology and environmental protection. The coordination of their efforts would make it possible to speed up the progress of the work. On the other hand, many of them do not have an experimental base. But it is more advantageous to set up experimental works, instrument rental centers and computer centers on a regional basis. The organization of cost accounting scientific production associations for the introduction of innovations for intersectorial use is also quite practicable.

Valuable experience has been gained during the implementation of regional programs on the acceleration of scientific and technical progress. In particular, the means of their formulation seems most important.

This work consists of several stages. At first the ministries, departments and industrial associations send out to the subordinate enterprises a draft of the basic assignments of the plan of the development of science and technology. On their basis the enterprises, in turn, draw up drafts of the plans of the technical development and organization of production, which they submit to the oblast planning commission. Here they are brought together in the draft of the regional plan of scientific and technical progress, the analysis of which makes it possible to elaborate suggestions on the improvement of the plans of individual enterprises and associations. After examination by the local party and soviet organs these suggestions are sent to the appropriate ministries and departments. The plans of the enterprises, which at the final stage the oblast planning commission brings together in the regional plan of scientific and technical progress, are made more precise during the consultations.

Perhaps, such a system will seem excessively complicated and cumbersome. But the fact that it is practicable and is of appreciable benefit, has been demonstrated in practice. In particular, for example, on the basis of the experience of Donetsk Oblast. Of course, for the successful implementation of such an approach the role of the local soviets and their planning commissions should be increased significantly. The latter more and more often have to take upon themselves the questions of the intensification of the specialization of production and the accomplishment of tasks of an intersectorial nature and to carry out the coordination. Therefore one should think about the broadening of their rights and functions.

It should be emphasized: the optimization of the management of scientific and technical progress on the regional level is seen not at all in serious

organizational rearrangements. It is a question of the further improvement of those forms and methods which have already been developed by practice. Here it is necessary to use with the maximum efficiency the formed administrative planning system, having aimed it at the search for the optimum solutions of the problems facing us.

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CSO: 1814/66

ORGANIZATION, PLANNING AND COORDINATION

ORGANIZATION OF LABOR AT KUTAISI SPECIAL DESIGN BUREAU

Moscow EKONOMICHESKAYA GAZETA in Russian No 48, Nov 84 p 8

[Article by Candidate of Technical Sciences Archil Serapionovich Dadunashvili, director of the Kutaisi Special Design Bureau for the Designing of Instruments and Means of Automation, in the column "The Director's Platform" (Kutaisi): "The Efficiency of the Work of the Designer"]

[Text] The Kutaisi Special Design Bureau for the Designing of Instruments and Means of Automation (SKBproyektpribor) is the main one in the development of instruments for determining the moisture content of bulk materials. The need for them is great. With each year the demands on their technical characteristics are increasing. Archil Serapionovich Dadunashvili, director of the SKBproyektpribor, tells about the search for new forms and methods of the organization of labor in the collective and the problems connected with this.

In prewar 1940 he graduated from the Power Engineering Faculty of the Georgian Polytechnical Institute. He was a participant in the Great Patriotic War. He worked long years in the system of the Georgian SSR Main Production Administration of Power and Electrification. He came to the SKBproyektpribor 18 years ago. He was the chief engineer. He has been the director since 1969. A. S. Dadunashvili is a candidate of technical sciences.

The dispute over the organizational structure of design bureaus has been going on for a long time. Which is better: isolated research and design divisions or divisions according to the directions of operations, which unite the researchers and designers of a given specialization? The disputes are not subsiding, and for the present design bureaus with structures of both types exist.

At our bureau before the early 1970's they adhered to the first version. In practice this looked as follows. The research divisions bring a development up to a working mock-up, while the design divisions already on its basis

produce a production prototype. Each of these two stages of the work had its own supervisor.

It was believed that such an arrangement of the work ensures a uniform and constant workload of the designers. But here, as a rule, disagreements arose between the makers of the mock-up and the final prototype, when at the concluding stage a discrepancy between the development and individual paragraphs of the specifications was detected. The work came to a stop, the period was dragged out, and the proposed better workload of designers was actually not obtained.

Life itself led us to the second version of the organizational structure. We united the divisions into combined research and design subdivisions, which are specialized strictly in accordance with the directions which have been attached to our special design bureau. Depending on the difficulty of the theme groups are singled out and a supervisor of the theme, who bears the responsibility not for some stage, but for the entire cycle--from the beginning of the development to its introduction in production--is appointed.

The brigade method became a logical continuation of such an organization of labor. Initially these were merely trials, but then the brigades turned into the only form of the organization of labor, which was accepted at the special design bureau.

The transition to the brigade form of the organization of labor yielded a good impact: the disruptions of the plan ceased, labor productivity increased.

The Designer Needs a Continuous Planning System

The work picked up speed. In itself this positive fact gave rise to a new problem. With what is one to busy the people who have completed the assignment of a previously planned period? It would seem that the brigade should then and there join in the elaboration of a new theme.

Unfortunately, the prevailing procedure of planning and financing design developments does not envisage the possibility of shortening the time. The internal ministerial supply orders are drawn up toward the end of the year which precedes the year being planned. Everything with this is clear. But economic contracts with enterprises and organizations of other sectors are concluded at best only during the year being planned, when the amount of financing by individual themes becomes known to the clients and the total amount of planned work is specified. Often this develops into that against which we, strictly speaking, undertook all the reorganization--idle times.

The design organization, in my opinion, should have reserve themes, with respect to which the freed units of the brigade could develop a backlog of operations. We need to know in advance, at least a year in advance, the assignments for the following period and to obtain the opportunity to conclude contracts beforehand.

An analogy with construction automatically suggests itself. When the backlog was not checked and there was not a sole client, the brigades at many

construction projects were idle. The construction workers found a solution, having introduced the "Orel continuous planning system." Everything points to the fact that the time has also come to think more objectively about improving the planning of design developments and about developing such a "continuous planning system" for designers. But is it, perhaps, also worth thinking about a sole client?

At our special design bureau we have found for the time being the following solution. Inasmuch as the shortening of the time is now of a systematic nature, we are introducing in the plans of the divisions long-range themes, with respect to which if only tentative specifications have already been received regardless of the existence of a specific financing organization.

Of course, there is a certain risk here. There have already been instances when it was never possible to conclude a contract on directive, approved themes.

The "3-Percent" Barrier

At times design bureaus find themselves in very tight limits. The financial plan is drawn up in such a way that the revenues from the themes being elaborated merely cover the expenses for the maintenance of the design organization. In case of the 100-percent fulfillment of the plan a specific profit can be formed only by the saving of material resources or by not bringing the staff up to full strength. Previously it was believed that such a profit normally can come to about 6 percent of the total amount of the expenditures on all themes.

But in February of last year the new instructions of the USSR Ministry of Finance "The Basic Regulations on the Planning, Accounting and Calculation of the Expenditures on Scientific Research and Experimental Design Work" were published, in which the following is stated: "In case of settlements for jobs, which have been completely finished and accepted by the client, a revision of the estimated cost of the scientific research and experimental design work is made. The revised (reduced) estimated cost, which is liable to payment, of scientific research and experimental design work, which has been completely finished and accepted by the client, should not exceed the actual expenditures by more than 3 percent (within the limits of the estimated cost which is established in the supply order or contract)." Thus, the permissible exceeding of the plan for such organizations as our special design bureau has been additionally reduced.

What is the result? If a design organization has decided to improve the work, strives to increase labor productivity and assumes additional assignments, its actual expenditures on the themes will decrease and problems with the profit and clients will arise.

Designers have a time-rate wage. The wages of personnel and the overhead expenses, which make up more than half of all the expenditures of design bureaus, are covered by means of the 100-percent fulfillment of the plan. In essence, there are no such expenditures on above-plan themes, designers and

auxiliary personnel fulfill them actually for free, but in the end provide a profit.

Everything seems to be clear, but they incessantly accuse us of overstating the estimated cost of operations. The basic source of the additional profit, they say, is concealed in this.

The new instructions plainly demand the decrease of the estimated cost of development. For whom will it become better from this? The client, for whom the amounts for the development of new equipment are planned and who reports on his own assets, in this situation will turn out not to be fulfilling the plan. While the output should be artificially understated for the designers, who tried to significantly exceed the assignment. These 3 percent, which were specified by the instructions, willingly or not pull them back. There is an obvious contradiction here, and our collective has already been faced with it. For every year we exceed the plan on the average by 8 percent.

It is self-evident that the fulfillment of the plan and the realistic nature of the estimates should be verified by the actual expenditures. But it would be more advisable to make this verification not with respect to each theme separately, but with respect to the expenditures of the organization as a whole. In our conviction, there is no need to limit the upper bound of above-plan operations.

As to the profit which has been obtained from the fulfillment of above-plan themes, it should, as is envisaged in the general statute on scientific research, design, planning and design and technological organizations, for the most part be paid into the revenue of the budget, while its remainder should be channeled into the material stimulation fund of the developers. For precisely such a mechanism is in effect at industrial enterprises.

With What Is the Pilot Works to Be Kept Busy?

The requirement: to increase the capacities of the basis experimental bases in the sectors of industry to a level, which ensures the verification of the results of scientific research and design development within a period of 1 years, is well known. The need for the consolidation of experimental and pilot production was also spoke about in the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy."

We carried out the retooling of our pilot works. And this, incidentally, in many ways contributed to the increase of the labor productivity of the brigades of developers. They obtained the opportunity to check more quickly in practice the correctness of the adopted technical decision.

The consolidation of the pilot works and the experimental base will be continued. This will make it possible to raise the quality of development to a new level and to increase labor productivity. However, it is very difficult to plan accurately the production and operational development of mock-ups at the pilot works. Here it is only theoretically possible to provide a constant

and maximum workload. In order to avoid idle times, would it not be better to be occupied with unplanned work?

At our special design bureau we set off in precisely such a direction. We began to produce several of the instruments which had previously been developed by our designers. There is a need for them, but not such a need so as to set up somewhere large-series production.

In short, the works is busy with useful work, but, as they say, at its own risk. For the time being no one seems to be prohibitng us from doing this. However, there is also no permission.

In my opinion, it is necessary somehow to legitimize the right of design organizations to produce over and above the plan small series of their own developments or consumer goods. Waste products, as well as the "nondisposable stocks" of other enterprises could become raw materials. Of course, here there should be strong barriers against all kinds of biases. The production of mock-ups and prototypes was and remains the basic task of the pilot works. But it would also be impractical to neglect such a reserve of the increase of work efficiency.

In short, it is necessary to search and act. It would be interesting to find out in "The Director's Platform" about how the problems of increasing the efficiency of design operations are being solved at other design bureaus.

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CSO: 1814/64

ORGANIZATION, PLANNING AND COORDINATION

DEVELOPMENT OF SCIENTIFIC, TECHNICAL, SOCIOECONOMIC FORECASTING

Moscow PRAVDA in Russian 15 Nov 84 p 3

[Article by Professor I. Bestuzhev-Lada, deputy chairman of the Committee of the All-Union Council of Scientific and Technical Societies for Scientific and Technical Forecasting: "Forecasting the Future"]

> [Text] It is difficult, as a rule, to alter natural phenomena by purposeful actions. Some day in the future we will learn, apparently, to arrange sunny weather or to cause rain "to order." Today it is already possible to disperse fog over an airfield, to force clouds to spill rain or to "discharge" a hail cloud--that, perhaps, is all. One thing remains: to know how to predict reliably in order to meet the element, while knowing what to expect from it.

Social phenomena are another matter. In principle all of them without exception lend themselves to modification by means of actions on the basis of some decisions or others (including with allowance made for predictions). True, in practice, as they say, there is no time for much, and frequently social processes develop, to use scientific terminology, "quasispontaneously," that is, like natural processes. But here it must not be forgotten that they can and should be objects of social control.

In our country the development of forecasting is connected with the need for the substantial increase of the degree of scientific soundness of national economic plans under the conditions of mature socialism. This has been repeatedly indicated in party documents. The procedure of formulating forecasts for the long-term future (up to 20 years) as a mandatory stage of socialist planning is specified by party and state decisions.

Owing to forecasting we now know comparatively much about what problems will most likely arise in the foreseeable future of the next 20 years and what the means of their optimum solution are. And still the potential of forecasting efforts can be used more effectively. There are unsolved problems in the area of the theory and practice of forecasting. This was also spoken about at the June (1983) CPSU Central Committee Plenum.

Upon acquaintance with the real state of forecasting efforts at scientific institutions of the most different type the nonuniformity of their development is conspicuous. A specific system of the forecasting service has not yet been formed everywhere. Frequently the desirable is passed off as the anticipated for the purpose of depicting the prospects in the most rosy color possible or "supporting" the orders for additional resources and so forth.

An important shortcoming--this time of a procedural nature--is the wording of the very assignment for the forecast, which at times is incorrect from a scientific point of view. Many clients of forecasts, especially at the level of sectors and regions, still require of the developers not prognostic studies of a basic or standard nature, but predictions after the pattern of weather forecasts.

In this case there can be only one correct statement of the question: What problems are anticipated and what are the possible means of overcoming the ripening problem situation? In other words, a standard method of preparing the basic and standard forecasts for each sector, region and each specific type of study is required. But for the present it is possible to count the methods of this sort on your fingers, and they are understandable to far from every specialist. Even the general standard method of scientific and technical forecasting is dated 1971 and was published in a an edition of only 200 copies. Recently such a method of social forecasting appeared, but also in a small edition. It is possible to guarantee that the majority of clients and developers have not seen either one.

"Rabochaya kniga po prognozirovaniyu" [The Workbook on Forecasting], which was published 2 years ago, was some help. But so far it is the only one and by necessity is of a universal nature--from hydrometeorological, geological and biological forecasting to ethnographic, legal and political forecasting. In all 20 basic spheres of forecasting are mentioned in this publication. Consequently, at least 20 "Workbooks" are needed--each for a specific sector. This is much, long, but very necessary work.

Modern scientific, technical and socioeconomic forecasting is supported by three "whales": the carrying over to the future of observable trends; modeling; the survey of experts. The most significant principles with regard to these methods were formulated two decades ago, and since then nothing essentially new has happened here. And it could not happen, because progress in the method, as is known, is directly dependent on the development of the theory and methodology, with which prognostication--the science of the laws of forecasting--is called upon to deal. Has not the period of its formation dragged on too long?

Indeed, the further development of the theory of forecasting involves great difficulties. But one of them is quite surmountable. The point is that in our country not one scientific institution deals specially and systematically with prognostication. The theoretical works in this field for the most part are a kind of "hobby" of specialists who work in other fields of science. It is clear that you will not get far on such a "hobbyhorse." The theory of forecasting is not at all such a subject, which it is possible to elaborate alone, sitting in an office. A scientific collective, and not only one, is

required here. And it is advisable, apparently, to begin with the more extensive inclusion of forecasting problems in the state plan of scientific research for the new five-year plan.

Finally, there is the question of staffs of theorists and practitioners of forecasting. It is hardly possible to establish a special forecasting institute or faculty. But there can and should be the forecasting specialization of seniors and graduate students, who have the necessary preliminary training.

Such specialization exists at a number of higher educational institutions of the country, where they give special courses on forecasting. Several chairs of the corresponding type have even been established. But, unfortunately, so far all this has not been brought together in a specific system. The individual higher educational institutions act in this respect as "soloists" (as a rule, relying on the enthusiasm of one instructor or another), but the result is not a harmonious "concerto." Once again standard methods for special courses, teaching aids on the basic fields and problems of forecasting and standardized demands on the training of specialists are required. The Committee of the All-Union Council of Scientific and Technical Societies for Scientific and Technical Forecasting and the Elaboration of Comprehensive Programs of Scientific and Technical Progress also has to step up the work on questions of the forecasting support of management.

A unified state forecasting service is gradually being formed in our country. A real possibility exists to speed up this process significantly. For forecasts as not only preplanning studies. They are scientific knowledge about the future, a means of increasing the efficiency of planning and improving the control of social processes under the conditions of mature socialism.

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CSO: 1814/62

ORGANIZATION, PLANNING AND COORDINATION

PRODUCTION INTENSIFICATION, CPSU SCIENTIFIC, TECHNICAL POLICY

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 10, Oct 84 pp 71-77

[Article by Doctor of Economic Sciences B. Shcherbitskiy and Candidate of Economic Sciences V. Tarasovich: "To the Front Lines of Science and Technology"]

[Text] The 26th CPSU Congress posed for the party and the Soviet people a task of historic importance: to bring all the sectors of the national economy to the front lines of science and technology, to accomplish the changeover of the socialist economy to the path of intensification. At the congress it was noted: "Each sector is faced with its own urgent tasks and special problems. But there are problems which encompass all spheres of the national economy and the main one of them is to complete the changeover to the primarily intensive means of development."

At the present stage the primarily intensive form of expanded reproduction has become an urgent necessity. This is due to the fact that the extensive factors to a significant extent have exhausted themselves. The unfavorable demographic situation, for example, is leading to the decrease of the influx of manpower resources, while the achieved level of their use is approaching the limit. Under the conditions of mature socialism the further broadening of the scale of production construction is also no longer a priority task. As has been repeatedly noted in the decisions of the Communist Party and the Soviet Government, new construction should be started, as a rule, only in those instances when it ensures the introduction of fundamentally new scientific and technical solutions. An increasing portion of the capital investments should be channeled into the retooling of operating enterprises. Moreover, in recent years a number of other factors, which are complicating the development of our economy, have objectively formed.

The current five-year plan should become the decisive stage in the changeover of the economy to the intensive means of development. It is envisaged to increase the proportion of intensive factors from approximately 30 percent during the 10th Five-Year Plan to 50 percent during the 11th Five-Year Plan. During the 1980's the leading increase of the end national economic results as compared with the increase of labor and material expenditures, including capital investments, is planned. The task has been posed to achieve an increase of the output of products at operating enterprises with a stable and

even a smaller number of employees. Whereas, for example, during the 10th Five-Year Plan for an increase of the national income by 21 percent it was necessary to increase fixed production capital by 43 percent and capital investments by 32 percent, according to the plan for the 11th Five-Year Plan, given an increase of the national income by 18 percent, an increase of fixed production capital as compared with the past period by 25 percent, given an increase of the amount of capital investments in the national economy by only 10 percent, is planned.

The achievement of a leading growth rate of the results of production as compared with the expenditures on its development is possible in case of the more efficient use of all types of production resources, the steady increase of labor productivity and the improvement of the organization of labor. The realization of these tasks requires the fundamental combination of the achievements of the scientific and technical revolution with the advantages of the socialist economic system and the furnishing of all sectors with equipment and technology, which would correspond to the greatest achievements of domestic and world thought and practice. "The retooling of sectors and the introduction of the latest achievements of science and advanced know-how," General Secretary of the CPSU Central Committee K. U. Chernenko stressed in a speech at a meeting with workers of the Moscow Serp i molot Metallurgical Plant, "are acquiring particular importance at the present stage. This is an urgent demand of the times, it can be said, a command of the era."

The unified technical policy, which is being persistently pursued by our party and the basic principles of which were formulated at the highest forums of the CPSU, serves these goals. It specifies the fundamental directions of the development of science and technology, the forms and methods of giving concrete expression to the forces and assets, which are necessary for this, the means of using the latter and the anticipated results.

Thus, for the implementation of the economic strategy of the party in the area of the saving of national labor, which is based on the utmost improvement of the use of fixed production capital and the decrease of the level of the materials-output ratio of the national product, it is very important to supplement the development of the labor-saving directions of scientific and technical progress with its capital-saving directions. The previously dominant forms of scientific and technical progress, while ensuring a saving of living labor, did not make it possible at the same time to save fixed production capital. As a result the steady increase of labor productivity was accompanied by the decrease of the output-capital ratio in the national economy, which reflected the objective conditions of the building of socialism at the stage of the rapid development of heavy industry and the creation of the multisectorial production system. At present the task of developing and introducing such equipment and technology, which would ensure both the increase of the productivity of living labor and the increase of the output-capital ratio and the decrease of the materials-output ratio of products, is arising.

The implementation of those directions of scientific and technical progress, which ensure the progressive development of science and technology and at the same time the most economical solution of the problems of the building of

communism, is an important task of scientific and technical policy under the conditions of the intensive development of the national economy. Scientific and technical policy encompasses the solution of such problems as the determination of the ratios in which existing and newly developed equipment should be combined; the ratios between the repair, modernization and updating of equipment; between the production of labor-saving, capital-saving and material-saving equipment, as well as the establishment of the rates of the replacement and updating of old equipment and the introduction of new equipment. Especially great attention is directed in it to the development and introduction in production of fundamentally new equipment, materials and advanced technology, as well as to the assurance of the increase of the production of machines and units of high power and productivity, highly economical equipment and systems of machines for the complete mechanization and automation of production, which encompass the entire technological process--from the introduction of raw materials into processing to the output of finished items. An important place is being assigned in the scientific and technical policy to the further complete mechanization and automation of technological processes, especially auxiliary and loading and unloading operations.

In accordance with the scientific and technical policy, which was formulated by the CPSU, during the 1980's special attention is being devoted to the automation of production on the basis of the use of the achievements of microelectronics and radio electronics. The priority introduction of automated systems for the control of technological processes is envisaged at resource-consuming and power-consuming works and in sections with working conditions, which are especially difficult and are harmful to the health of man. In this next few years it is necessary to cover the path from the automation of individual technological processes and the development of completely mechanized and automated sections and lines to the complete automation of production. Here a significant role is being assigned to robotics. It is planned already during the 11th Five-Year Plan to produce and introduce about 50 models of industrial robots, 38 technological sets of the "machine--automatic manipulator" type and 17 automated sections and shops, which are equipped with automatic manipulators.[2]

In the increase of the efficiency of social production greater and greater importance is being attached to scientific and technical progress in the area of objects of labor, especially construction materials. It is a question of changing the structure of their balance. The leading increase of the production of synthetic resins and plastics and the enlargement of their assortment will make it possible to increase the proportion of these construction materials and to decrease the proportion of traditional ones, first of all metals. Scientific and technical progress in the area of production technology is inseparably connected with this. Here the development and introduction of fundamentally new technological processes, technology with few operations and with the minimum number of changeovers, as well as technology which envisages the maximum use of raw materials, that is, so-called waste-free technology, are the general policy.

The utmost increase of the quality of the products being produced is one of the central problems of scientific and technical policy. The quality of means

of production is characterized by such technical and economic indicators as weight, size, power, operating speed, the consumption of electric power and fuel, the consumption of material and others; consumer items--by the functional and esthetic parameters. The achievement of the end results, as was noted at the 26th CPSU Congress, in many ways depends on the work of the "upper tiers" of the corresponding sectors. In ferrous metallurgy--on the so-called fourth conversion, in construction--on finishing operations, in light industry--on the processes which conclude production, as well as on the assurance of radical changes in the qualitative characteristics of the source materials. On this basis the task of the significant increase of the quality of metal, first of all its strength, anticorrosion and other technical properties, is being brought to the forefront. Polymeric and composite materials, plastics, parts made from compressed wood and others are finding more and more extensive use in industrial and civil construction, in machines and equipment and in household, cultural and personal goods.

The question of increasing the quality of machine building products is acquiring particular urgency. In our country many obsolete types of machines are still being produced, as a result of which a large amount of metal and other critical materials and a significant portion of living labor and production capacities are being used for the production of equipment of yesterday.

The effective solution of any national economic problem today is possible only in case of the extensive use of the achievements of science. "It is quite obvious," it was stressed at the 26th Ukrainian CP Congress, "that in the present age, under the conditions of the scientific and technical revolution, all roads to production efficiency lead through science, which is showing itself more and more as a direct productive force. Therefore the further improvement of the organizational forms of the management of scientific and technical progress is an urgent necessity.

"Only after properly developing the mechanism of the contact of science with production is it possible to shorten drastically the time of the realization of a scientific idea--from its origination to the series production of new types of products."

Scientific knowledge as the result of creative scientific work is being used for the improvement of social relations and for the improvement of the system of the organization of production and its management. But science exerts the greatest influence on the development of productive forces through technology, through the improvement of its physical and material components.

The role of science in the development of productive forces and the scientific support of the needs of social practice appears, first of all, in the increase of the importance of basic research, which is aimed at the thorough study of the essence and mechanism of the processes which occur in nature and society.

The unity of theory and practice is one of the sources of success of scientific research. Theoretical hypotheses should undergo checking by practice and the experiment. "The gap between theory and the experiment, between theory and life, between theory and practice is symptoms of serious

irregularities of the development of science,"[3] well-known Soviet scientist Academician P. L. Kapitsa wrote.

The 26th CPSU Congress outlined the basic directions of basic research, which is called upon to provide the basis for the further increase of the scientific and technical level of production. The increase of the universality of the interaction of science and physical production is a feature of the transformation of science into a direct productive force under the conditions of mature socialism. The active influence on production of the results of research and development appears in the development of new tools and objects of labor, the discovery of new sources of energy and the introduction of fundamentally new technological processes.

Modern science does not confine itself to the improvement of individual components of the productive forces, it examines all the components of the production process in inseparable interconnection, in interrelationship with man and the environment, which has made it possible to shift from the improvement of individual aspects of technological processes to the development of the optimum processing methods on the basis of the achievements of science and technology.

The imposing tasks in the area of the development of science and technology, which were elaborated by the 26th CPSU Congress and were specified at the November (1982), June and December (1983) CPSU Central Committee plenums, as well as in the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy," are being successfully fulfilled. In 1983 alone 3,500 models of new types of machines, equipment, apparatus, instruments and means of automation were developed in the country on the basis of the achievements of science and technology.

With each year the implementation of the program on the increase of the volumes and the enlargement of the scale of the introduction of the achievements of science and technology in production is gathering speed. In 1983 just at industrial enterprises of the country more than 11,000 mechanized flow and automatic lines were installed, more than 5,000 sections, shops and works were changed over to complete mechanization and automation and 3,700 descriptions of new types of industrial products were assimilated in production.[4]

All the union republics, including the Ukrainian SSR, are making a significant contribution to the implementation of the all-union program of the introduction of the achievements of science and technology. At its industrial enterprises in 1983 2,200 mechanized flow and automatic lines were installed, 1,700 sections, shops and works were completely mechanized and automated, the production of 930 descriptions of new types of industrial products was assimilated.[5]

The introduction of advanced technology and the mechanization and automation of production, the assimilation of new types of products and the modernization of operating equipment in industry of the Ukrainian SSR are making it possible to save annually on the average the labor of about 120,000 workers; the annual

additional profit from the implementation of scientific and technical measures per year exceeds 600 million rubles. The introduction of new equipment and the implementation of measures on the scientific organization of labor are providing more than 60 percent of the total increase of labor productivity in republic industry.[6]

The large amount of work on retooling operating enterprises, which is being performed in the country, is having a significant influence on the increase of production efficiency. As was planned by the highest forums of the CPSU, the amount of capital investments in this direction of the reproduction of fixed capital is increasing with each year. Thus, whereas the proportion of capital investments in the renovation and retooling of operating industrial enterprises of the Ukrainian SSR in 1975 came to less than 25 percent of all the productive capital investments in republic industry, during the years of the current five-year plan it has already increased to 40 percent.

The gained experience in the retooling of operating production attests to the great effectiveness of the expenditures on its performance. Thus, as a result of the retooling and renovation of many machine building enterprises labor productivity increases by 1.6- to 2.5-fold, the expenditures on production decrease by 13.5-36 percent. Here the average monthly wage of the workers increases (at a number of plants by 10-15 percent) and the proportion of the wage fund in the total expenditures on production decreases by 6-10 percent and more.

For enterprises, for example, of chemical machine building of the Ukrainian SSR each percent increase of fixed production capital yields up to 1.6 percent of the total increase of output and up to 0.9 percent of the total increase of labor productivity. In case of new construction 1.5- to 2-fold more capital investments would be required for the assurance of a similar increase of capacities. The experience of enterprises of other sectors also attests to the great effectiveness of retooling.[7]

It should be emphasized that the role of scientific and technical development goes beyond its influence on the increase of the productive forces of society. Lenin's fondest dream--the maximum facilitation of labor and its transformation into the first vital need of man--is being successfully realized in our country on the basis of the extensive introduction of the achievements of science and technology and the complete mechanization and automation of production. The progressive changes in the area of science and technology are actively influencing all the components of the social organism and social interrelations.

For the increase of the influence of scientific and technical progress on the efficiency of social production it is necessary to increase the role of science, and first of all to strive for a greater yield from sectorial scientific research institutions, planning and design and technological organizations. At present the developments of sectorial science do not yet hold the place which they could. The research conducted at the Scientific Research Institute of Economics of the Ukrainian SSR State Planning Committee showed that the low level of the use of scientific developments is explained not only by certain difficulties, which are inherent in the very process of

introducing innovations in production, but also to a significant extent by their incomplete readiness for practical use and by an insufficiently high quality.

It is well known that in recent years in the Ukrainian SSR, as in the country as a whole, much has been done so that the set of operations on the "science--production" cycle would end with appearance in practice. However, the amount of scientific research and development, which end with intermediate results, is still large. Of all the scientific research and development, which have been conducted in recent years by scientific institutions of the republic, only about 15 percent have concluded with the production of prototypes of new items or the pilot testing of new technological processes.

An important reserve of the increase of the effectiveness of the expenditures on scientific research and development is the increase of the scientific and technical level of the latter. The proportion of completed operations, the scientific and technical level of which exceeds the level of the best domestic and foreign developments (in the total number of completed operations, with respect to which this indicator was determined), at present at the sectorial scientific organizations of the republic does not greatly exceed 20 percent. Of the most important new types of products, which have been assimilated in recent years in conformity with the state plan of economic and social development, only about half were developed by sectorial science, academic science and science of higher educational institutions. The remainder were developed by the forces of associations and enterprises.

The number of innovations, which were developed at the level of inventions, is one of the indicators which characterize the scientific and technical level of scientific research and planning and design operations. If we approach the evaluation of the results of the activity of scientific organizations from this standpoint, it is necessary to admit that their contribution still does not satisfy the present requirements. The analysis shows, for example, that there are only 12 inventions per 100 developments completed by planning and design organizations. If it is considered that some of the completed developments contain several inventions, less than one-tenth of the developments completed by these organizations actually conclude with inventions. Here far from all the inventions, which have been obtained at scientific research and planning and design organizations of the republic, find extensive practical use, although, it would seem, they should first of all be introduced in practice. However, the statistical data show that the proportion of introduced developments, in which inventions were used, in the total number of used developments on the creation of new machines, equipment, apparatus, instruments, materials and new technological processes in the past 5-7 years has not exceeded 25-30 percent.

The shortcomings, which exist in the use of the scientific potential, are adversely affecting the pace and efficiency of the work on the increase of the technical level of production. It should be noted that production workers also do not always treat with proper understanding the need for the quickest introduction of everything useful that science develops. Due to this the scale of the introduction of measures on new equipment in the republic is still not adequate. A significant number of enterprises are not implementing

measures on the increase of the technical level of production or are performing this work in small amounts.

The work being performed in the republic on the mechanization and automation of production processes is yielding positive results. As a result of it, the degree of coverage of workers by mechanized labor during the 11th Five-Year Plan is increasing at a greater rate than during the 10th Five-Year Plan. However, it is impossible to recognize this rate as sufficiently high. This especially concerns ancillary production, in which every other worker works today. Here the proportion of workers, who are engaged in mechanized labor, on the average is approximately half as great as in basic production.

Frequently the anticipated impact from the increase of the scale and the acceleration of the rate of the introduction of the achievements of science and technology is not achieved due to the incomplete coverage of related works by these measures. The analysis of the work on the retooling of a number of industrial enterprises shows that in case of the steady increase of its scale this most advanced form of the expanded reproduction of fixed capital is often of a uncoordinated, incomplete nature, which leads to the disparity of the production capacities of related equipment, sections, shops and, at times, works.

A more rapid pace of the replacement of fixed capital by means of the introduction of advanced equipment is necessary. At present, in spite of the fact that the work on the introduction of new equipment in republic industry is providing a significant share of the expanded reproduction of fixed capital, the rate and level of the qualitative updating of tools of labor are still inadequate. On the average not more than 2.5 percent of the active portion of the fixed production capital is replaced by means of the introduction of new equipment. The increase of the amounts of work on the modernization of operating equipment is no less important for the increase of the efficiency of social production. However, at the industrial enterprises of the republic this highly efficient direction of the introduction of new equipment has also not received proper development.

The use of the reserves of the acceleration of the rate of the development of science and technology and the further increase of the efficiency of the latter require the constant improvement of the system of the management of scientific and technical progress.

In mature socialist society the rate of the acceleration and the scale of the introduction of the achievements of science and technology are predetermined not only by how successfully the forms of the combination of science with production, which are characteristic of socialism, are implemented, but also by how suitable the very economic mechanism of the management of the national economy is for the solution of this problem.

In recent years in our country much work has been done on the accomplishment of the task posed by the CPSU of the fundamental combination of the achievements of the scientific and technical revolution with the advantages of the socialist economic system. Much has been done for the further improvement of the mechanism of the planned management of the development of science and

technology. Definite experience in the drafting and implementation of complex and large-scale scientific and technical programs has been gained. The diverse forms of the connection of science with production, which are characteristic of socialism, have undergone extensive development.

At the same time the presently prevailing mechanism of the management of scientific and technical progress still does not fully conform to the tasks of the acceleration of the pace of its accomplishment, which were outlined by the 26th CPSU Congress. The goal orientation of the plans of the development of science and technology is not ideal. In case of the planning of scientific and technical development the approach from the standpoint of the established practice of the current planning of production from the achieved level has not yet been eliminated; it is inadequately linked with the end socioeconomic results.

The plans of the development of science and technology, as before, are drafted at the same time as the other sections of the national economic plan, but this does not make it possible to reflect most thoroughly in the latter the economic results of scientific and technical progress. These plans have not yet become a fundamental part of the entire national economic plan. Only individual, although important, but in many cases incomplete assignments, which do not have the proper influence on the increase of the technical level of the sectors of the national economy, are envisaged in them.

The methods of evaluating the economic effectiveness of measures on the introduction of advanced technology and the mechanization and automation of production processes require further improvement. This pertains not only to the calculations of the annual economic impact, which are necessary for the determination of the advisability of including some scientific and technical measure or another in the plan, but, mainly, to the determination of their actual influence on the profit, the product cost, the level of expenditures of living labor, the volume of output of products, the quality and other technical and economic indicators.

The planning of the retooling of production has not acquired a systems nature and does not have unified procedural principles (from the enterprise to the national economic level). Whereas a special section of the plan, which is devoted to the modernization and replacement of obsolete equipment, accessories and tools, is drafted at industrial enterprises, such sections are lacking in the plans of ministries and departments and in the state plans.

Up to now when specifying the directions of scientific and technical development and formulating the plan of new equipment for the most part they have directed attention to the established themes of the work which can yield results in the shortest possible time. This provides a certain gain of time and assets and increases the effective yield of design developments, but at the same time increases the time lag in creative technical work and creates the conditions for the appearance of what is called "seemingly new" equipment. At times such an approach comes into conflict with the long-range goals of socioeconomic development.

For the elimination of these shortcomings it is necessary to make the tasks of the long-term socioeconomic development of the country, the republic, the sector and the works the reference base of the plans of the development of science and technology. Not specific scientific and technical developments in themselves, but the end national economic results, which it will be necessary to ensure by means of such developments, will only then be the aim of these plans.

Practical experience shows that the achievements of science and technology have the greatest influence on the increase of the efficiency of social production in case of the concentration of forces and assets on the decisive directions of scientific and technical progress. Such concentration is achieved in case of the goal program methods of the management of the solution of important scientific and technical problems. The results of the fulfillment of scientific and technical comprehensive goal programs in the Ukrainian SSR attest to this. Thus, a significant saving of raw materials and materials, including more than 600,000 tons of rolled ferrous metal products and 100,000 tons of cement, was obtained in 3 years of the effect of the program "Metal." The implementation of the program "The Power Complex" made it possible to save 2.8 million tons of conventional fuel, 4.5 billion kWh of electric power and 17 million gigacalories of thermal energy. The program "Labor" holds a special place. The fulfillment of its assignments, which were aimed at the improvement of working conditions and the increase of labor productivity by means of the introduction everywhere of means of mechanization and automation, during this time made it possible in republic industry alone to transfer 230,000 workers to mechanized labor.

The implementation of the assignments of the programs in many ways contributed to the fact that the productivity of national labor in the republic increased by more than 12 percent, and this is equivalent to the saving of the labor of 2.3 million people. The entire increase of the national income--more than 10 billion rubles--was obtained owing to the increase of labor productivity.[8]

The planning of capital investments and the improvement of the management of capital construction are an effective lever of the pursuit of the unified scientific and technical policy. For the extensive introduction of the achievements of science and technology is achieved precisely by means of capital construction. Capital investments are the economic base of the development and use of technically more advanced tools and objects of labor. Even in those sectors, in which scientific and technical progress consists not in the development of new types and the improvement of the existing tools of labor, but in the improvement of technological processes and the use of new raw materials and materials, that is, it would seem, does not require the use of capital investments, still the development and placement into operation of new fixed capital are the initial thing in the implementation of these directions. It is placed into operation either in the sectors, in which raw materials and materials are produced, or in the sectors which produce and supply equipment for the introduction of more advanced technology. Therefore, the concentration of capital investments "on the main directions, on the most important start-up projects, and first of all on the renovation and retooling of operating enterprises,"[9] is one of the main levers which were developed by

the 26th CPSU Congress for the implementation of the unified scientific and technical policy.

The use of capital construction as the basic means of implementing the unified scientific and technical policy requires the radical improvement of the practice of designing. For in much the same way as the efficiency of new equipment to a significant extent is incorporated at the stage of its development, the technical and economic indicators of new works--the output-capital ratio, the profitability and others--are determined in the process of their designing. Only the carrying out of capital construction in accordance with plans, in which the achievements of science and technology are taken as much as possible into account, will make it possible to implement successfully the decisions of the CPSU on the extensive use of the complete processing of raw materials, resource-saving equipment, low-waste, waste-free and energy-saving processing methods and the considerable use of local types of raw materials and materials.

For the implementation of the unified scientific and technical policy it is necessary to join science and production more closely by means of economic levers. Specific steps in this direction were specified by the decree of the CPSU Central Committee and the USSR Council of Ministers "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing Production Efficiency and Work Quality" (1979). Among them are the changeover to the new procedure of financing scientific research and development from the unified fund for the development of science and technology, the changeover of scientific research, planning and design and technological organizations, as well as industrial enterprises to the cost accounting system of operations on the development of new equipment on the basis of supply orders and others.

An especially broad program of measures on the acceleration of the rate and the increase of the efficiency of scientific and technical progress is outlined in the decree "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy," which was adopted in August 1983 by the CPSU Central Committee and the USSR Council of Ministers and by which the further broadening of the use of the goal program method in the management of the development of science and technology is envisaged. In addition to all-union programs, regional programs are also being introduced in the system of national economic planning. "Their objective necessity and importance are dictated by the fact," V. V. Shcherbitskiy stresses, "that they make it possible in practice to implement Lenin's principle of the combination of the sectorial and the territorial principle in the management of the national economy, to unite centralized planning with the activity of regional organs of management, which operate as a public service, and with the broad initiative of production and scientific collectives."[10] Planning organs, ministries and departments, associations, enterprises and organizations are ordered by this decree to proceed in their activity from the fact that in the next few years industry should ensure the output of products, which in their indicators conform to the best present models, as well as the introduction of advanced technological processes, and labor productivity in the national economy should be increased significantly on this basis.

The quickest possible implementation of the measures outlined by the CPSU on the acceleration of scientific and technical progress will make it possible to achieve a significant increase of the efficiency of social production and on this basis to ensure the further steady development of the economy of the country and the improvement of the well-being of the Soviet people.

FOOTNOTES

1. See A. G. Aganbegyan, "The Triumph of Scientific Foresight," NAUKA V SIBIRI, No 20, 28 May 1983.

2. See "Automatic Manipulators," EKONOMICHESKAYA GAZETA, No 22, 1983, p 2.

3. P. L. Kapitsa, "Eksperiment, teoriya, praktika" [The Experiment, Theory, Practice], Moscow, "Nauka", 1974, p 288.

4. See PRAVDA, 29 January 1984.

5. See PRAVDA UKRAINY, 22 February 1984.

6. See "Narodnoye khozyaystvo Ukrainskoy SSR v 1980 godu. Statisticheskiy yezhegodnik" [The Ukrainian SSR National Economy in 1980. A Statistical Yearbook], Kiev, "Tekhnika", 1981, p 62.

7. See "Planovoye upravleniye razvitiyem nauki i tekhniki v soyuznoy respublike" [The Planned Management of the Development of Science and Technology in the Union Republic], Kiev, "Naukova dumka", 1981, p 181.

8. See PRAVDA, 18 January 1984.

9. "Materialy XXVI s"yezda KPSS" [Materials of the 26th CPSU Congress], Moscow, Politizdat, 1981, p 140.

10. IZVESTIYA, 1 October 1983.

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CSO: 1814/56

ORGANIZATION, PLANNING AND COORDINATION

INCREASE OF EFFICIENCY IN MANAGEMENT OF SCIENTIFIC, TECHNICAL PROGRESS

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA EKONOMICHESKAYA in Russian No 5, Sep-Oct 84 pp 26-36

[Article by B. G. Ivanovskiy: "Some Problems of Increasing the Efficiency of Science and Technology"]

[Text] The need for the rapid assimilation of technical innovations as an indispensable condition of the changeover to the primarily intensive type of reproduction is substantiated in the article. The set of indicators of the efficiency of new equipment is examined, the principles and criteria of its use under socialism are also specified. The basic directions of the improvement of the mechanism of planning, financing, stimulation and pricing in the area of the acceleration of scientific and technical progress are distinguished. The experience of several CEMA member countries and developed capitalist countries in the management of scientific and technical progress is covered.

The 26th CPSU Congress posed the program task to bring all the sectors of the national economy up to the leading levels of science and technology. The laws of the movement of the socialist economy, which define the demands which are being made on scientific and technical progress under present conditions, are expressed in concentrated form in this task. The planned nature of development, which is inherent in the socialist economic system, makes it possible to specify deliberately the most effective directions of scientific and technical progress, the dynamics and structure of social production in conformity with the increasing needs of society and its members. The development of science and technology under socialism, while ensuring the steady increase of the productivity of national labor, is combined with the full employment of the population, the increase of the general educational and the vocational and technical level of the working people and the increase of the well-being and cultural level of the people. Systematically organized and directed social production makes it possible to pursue a unified scientific and technical policy on the scale of the entire national economy, linking together all the units of the "science--technology--production" cycle.

"Intensification, the rapid introduction in production of the achievements of science and technology, the implementation of major comprehensive programs--all this in the end should raise to a qualitatively new level the productive forces of our society," General Secretary of the CPSU Central Committee Comrade K. U. Chernenko indicated at the February (1984) CPSU Central Committee Plenum.

The rapid assimilation of new generations of equipment and fundamentally new processing methods is becoming at the present stage an indispensable condition of the changeover to the primarily intensive type of socialist reproduction and the main source of economic growth.

The changeover to the path of intensification was prepared by all the preceding development of the economy of the country and conforms to the laws of economic growth during the period of mature socialism, which develops on its own basis.

The essence of the intensification of production was revealed with exhaustive thoroughness by the classics of Marxism-Leninism. K. Marx noted in "Kapital" [Capital] that there are two forms of expanded reproduction--extensive expanded reproduction, when the field of production is expanded, and intensive expanded reproduction, when more efficient means of production are used [1]. From this it follows that the intensive means of development signifies the expansion of production not by the construction of new enterprises or the increase of the capacities of operating enterprises, but by the change of its technical base. In other words, intensification is directly connected with technical progress, with the increase of the efficiency of the equipment being used. Only under these conditions is the leading increase of the final product as compared with the expenditures achieved, that is, is the increase of the efficiency of all social production ensured.

The achievement of a qualitatively new technical level of production under the conditions of intensification should not only ensure the replacement of manual labor by mechanized labor, but also contribute to the reequipment of previously mechanized sectors and works for the achievement of a saving of both living and embodied labor. This predetermines the basic demand on technical innovations, the introduction of which should promote the saving of the aggregate expenditures of assets and labor per unit of the finished product. The assurance by means of new equipment and processing methods of a resource-saving direction of economic growth also constitutes the main distinctive trait of current scientific and technical progress.

However, the aspiration for the increase of the capital-worker ratio and the increase of the expenditures of embodied labor for the purpose of achieving a saving of living labor is still frequently in our economic practice. Of course, given the tight balance of manpower resources, this saving remains an urgent problem. Nevertheless the basic task is for the increase of labor productivity to be accompanied by the decrease of the specific expenditures of fuel, raw materials, materials and fixed capital.

At present the changeover of our economy to the path of intensive development is still being carried out at an inadequate pace. The relatively long period

of the introduction of scientific and technical achievements in production is one of the reasons for this. Meanwhile, when fulfillment the plan assignments of the current five-year plan and first of all the stepped-up assignments on the increase of labor productivity the economic units are directing their attention precisely toward the use of the achievements of scientific and technical progress in the national economy.

The decree of the CPSU Central Committee and the USSR Council of Minister "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy" of 1983 aims scientific and economic organs at the increase of the level and effectiveness of scientific research work, the active promotion of the large-scale introduction of the achievements of science in production and the concentration of the scientific potential on the accomplishment of the key tasks, which ensure the meeting of both the current and the long-range needs of the national economy.

Under the conditions of the changeover of the economy to the path of intensification in the system of the management of social production the demands on the efficiency of new equipment are increasing sharply. The unified state scientific and technical policy, the plans of scientific research and planning and design organizations and the plans of associations and enterprises on the introduction of new equipment are formulated with allowance made for efficiency.

The efficiency of new equipment, just as of any other economic measure, is determined by comparing the results and the expenditures. Here it is necessary to take into account all the expenditures on the development and assimilation of new equipment, regardless of the time and place of their making. These expenditures should be compared with the integral results of the national economy, which are the sum of the impact (loss) of the producer of new types of means and objects of labor and the saving of the user.

Indicators, which are called upon to measure indirectly the effectiveness of measures on the increase of the technical level of production and product quality--the relative decrease of the number of workers, the increase of labor productivity, the decrease of the production cost and others--are envisaged in the prevailing Method of Determining the Efficiency of New Equipment. However, this set of indicators does not make it possible to evaluate completely the contribution of new equipment to the increase of the efficiency of social production. A general-purpose indicator, which would make it possible in each specific case to determine more precisely the national economic impact of the use of new equipment and to penetrate all the activity on its development, assimilation and production and the introduction of innovations, is needed for a more complete evaluation. The amount of the saving of aggregate national labor, which is achievable as a result of the use of new equipment, should act on the theoretical level as the criterion of the national economic impact. In practice it can be the difference between the cost of the work, which is performed by the given type of equipment, and the total expenditures on its production and operation. The use of the indicated criterion of the national economic efficiency of new equipment will make it possible to switch to the determination of the decrease of expenditures per

unit of useful work in combination with the planned increase of the national income.

The saving or excessive consumption of the resources, which are involved in social production, will show the change of labor productivity on the scale of the entire national economy and will be reflected in the indicators of the increase of the national income. Thus, there can be used as the criterion of the national economic efficiency of the development and use of new machines and equipment, materials and technological processes the increase of the national income, which is obtainable from their development, production and use as compared with other versions of the meeting of a specific need of the sphere of physical production or the increase of the well-being and cultural level of the people. The achievement of this criterion depends first of all on the efficient activity of enterprises, sectors and so on.

The indicator, which corresponds to this criterion, can be calculated on the basis of the comparison of the production engineering and social results of the use of the operating and new means and objects of labor--the production volumes, the level of labor productivity, the specific expenditures of raw materials, materials and energy, the durability and reliability of equipment, the working and living conditions of workers.

However, given the prevailing system of efficiency only the saving on the wages of the workers, who have been freed from the sphere of the given works, is considered as a result. In individual ministries the expenditures from public consumption funds are reflected as an experiment in the saving on the remuneration of labor. This is being done by the introduction of the corresponding coefficient, which is equal to 1.35, for wages.

Nevertheless practical experience shows that the saving on the remuneration of labor, which is obtainable by the freeing of workers, does not offset all the expenditures which are connected with the development, introduction and assimilation of new equipment. On the average in the past 6-10 years the capital investments per conditionally freed worker in case of the introduction of means of mechanization have come to: in the USSR Ministry of Light Industry--7,000 rubles, the USSR Ministry of Power and Electrification--10,300 rubles, the USSR Ministry of Ferrous Metallurgy--11,600 rubles, the Ministry of the Chemical Industry--28,000 rubles. In case of the automation of production with the introduction of mechanized manipulators (robots) these expenditures are significantly greater [3].

The increased current production expenditures on raw materials, materials, power and so on, which signify in fact the diversion of assets from physical production in the process of developing new machines and equipment, which leads to the decrease of the amount of the surplus product being created on the scale of all of society, is also not taken into account in case of such an approach to the determination of the efficiency of new equipment. Society bears "losses" of a sort, which it is necessary to take into account in case of calculations of the efficiency of technical innovations which are being developed.

In practice the same result from the introduction of new equipment can be achieved, as a rule, by using different amounts of resources. Therefore it is necessary to ascertain, what measure on the development and introduction of new equipment is most efficient for society and in what case the impact is greater.

For this it is necessary first of all to identify the economic limits of the use of machines under socialism.

The principles, which were formulated on this issue by the classics of Marxism-Leninism, are the underlying principles in this determination. "But whereas... at first glance it is clear," Marx wrote, "that large-scale industry... should have increased labor productivity exceedingly, it is far from that clear, whether this increase of the productive force is being bought by the increase of the expenditures of labor elsewhere" [2]. Thus, by the economic limits of the use of new equipment one should understand the objectively necessary measure of the saving of embodied labor, the achievement of which is a condition of the introduction of this equipment in the national economy. Here the condition of the saving of living labor is important, but insufficient for a conclusion about the advisability of the introduction of one machine or another under socialism. It is necessary to take into account the entire amount of the expenditures on it, including one-time expenditures.

The practice of national economic planning and the designing of new production facilities in our and other socialist countries in essence is already using extensively such a method of taking into account the aggregate expenditures of labor. These are the adjusted expenditures, which are calculated by means of the standard coefficient of the effectiveness of capital investments.

The quantitative expression of the criterion of the economic efficiency of new equipment is defined with sufficient accuracy for economic calculations as the difference of the adjusted expenditures which are necessary for the production and use of the equipment being replaced and the development, production and operation of the new equipment.

The choice of the object of comparison of the expenditures, which are necessary for the development of technical innovations, and the results, which are obtainable in case of their use, plays a no less important role when determining the efficiency of new equipment.

At present nearly 200,000 themes a year are elaborated just at sectorial scientific research and planning and design organizations. They conclude, as a rule, with the development of new machines, apparatus, instruments, devices and technological processes, as well as with the formation of new methods and structures of management and means of the organization of labor. Individual calculations of efficiency are made with respect to each of these objects. Then the newly developed means and objects of labor are included in some technological process or set of equipment, which, in turn, act as objects of the evaluation of efficiency. Thus, the two- and three-stage consideration of the same results continuously occurs.

It is impossible to provide recommendations on the choice of the object of the evaluation of the efficiency of new equipment for each specific case, since it is difficult to take into account the role of all machines, apparatus, units, devices, instruments and materials in the production cycle. When determining the object of the evaluation of efficiency it is advisable to proceed from the following premise. It should either independently "realize" the production cycle, a relatively isolated part of it or replace the traditional means and objects of labor in the production cycle, in a set of equipment without any changes of their other components.

The prevailing system of the measurement of efficiency envisages the reflection of the saving for the user, which is obtainable during the service life of the newly developed means of labor (with allowance made for obsolescence). The impact of new technological processes is determined after 1 year of their use. Probably, it is necessary to make the calculation of the impact of new production technologies with allowance made for the service life of the basic equipment being used.

The elaboration of a precise criterion of the economic impact of the introduction of new equipment will promote the increase of the technical level and the increase of the end results of production, but this can be achieved only when the indicators of the efficiency of scientific and technical progress are coordinated with the entire system of cost accounting.

However, the set of planning and evaluation indicators of the activity of ministries, departments, enterprises and associations, which is now being used, is still inadequately oriented toward the acceleration of the technical improvement of production. The volume indicators of production, which do not ensure the proper interest of associations and enterprises in the acceleration and the increase of the efficiency of the introduction of new equipment, are the decisive components of this set. Take, for example, the indicator of the standard net output. First of all its increase is important for the enterprise. The assimilation of a new product ensures the increase of this indicator owing to the increase of the labor intensiveness during the first years of its production. For those enterprises, at which the introduction of technical innovations decreases sharply the labor intensiveness and the cost of the production of the product and, consequently, the indicator of the standard net output, it becomes unprofitable. Therefore the indicator of the standard net output cannot fully reflect the efficiency of new equipment. This shortcoming, admittedly to a somewhat small extent, is also characteristic of other volume indicators of production (the commodity production, the sold output, the amount of the profit).

The practice of economic activity is attempting to adapt itself to the imperfection of the indicated volume indicators. Thus, in conformity with the decree of the CPSU Central Committee and the USSR Council of Ministers on the improvement of the economic mechanism of 12 July 1979 the increase of the production of products of the highest quality category, the increase of labor productivity, the assignments on the decrease of the product cost, the limits of expenditures on basic materials and others have been introduced among the planned and evaluation indicators of the production activity of associations and enterprises. However, the influence of volume indicators on production

still remains very strong, since they serve as the basis of the calculation of the most important indicators which characterize the efficiency of the production operations of enterprises and associations.

The further improvement of the economic mechanism is inconceivable, therefore, without the elaboration of unified criteria of the efficiency of production as a whole, the use of operating equipment and the introduction of new, more productive and economical equipment. As was noted at the November (1982) CPSU Central Committee Plenum, "the methods of planning and the systems of material stimulation should contribute to the combination of science and production. It is necessary that those, who boldly agree to the introduction of new equipment, would not be in a disadvantageous position."

A number of measures on the increase of the planned influence on the acceleration of technical progress have been implemented in recent years. Long-term scientific and technical goal programs, which concentrate resources on the key, promising directions of the development of science and technology, are being formulated. Assignments on the development of new generations and models of equipment, the assimilation and the development of the production of new items and the discontinuation of obsolete items, the increase of the technical level and quality of products and the economic impact of the implementation of scientific and technical measures are being included in the five-year and annual plans. The long-term forecasting and the long-range planning of scientific and technical development are becoming integral components of the drafting of the plans of the economic and social development of the country.

The improvement of the planning and economic stimulation of scientific and technical development should interest the collectives of enterprises in the adoption of intensive plans on new equipment, the fulfillment and exceeding of the long-range plans of scientific and technical progress and the long-term programs.

A substantial reserve of the increase of the effectiveness of planning levers of the acceleration of scientific and technical progress is the increase of the stability of the plans and the tightening up of planning discipline. The nonfulfillment or adjustment of the plan assignments on the development and introduction of new equipment and the equalizing distribution of the impact of its assimilation, which weakens the cost accounting influence of the economic planning mechanism on the collectives of enterprises, is a more and more frequent phenomenon. The assurance of the stability of the indicators and standards of the five-year plan increases the stimulating influence of the plan and cost accounting. Sound and stable plan assignments can serve as the basis of the evaluation of the end results of the activity of enterprises and associations in the area of scientific and technical progress.

In this connection the practice of planning scientific and technical progress in the CEMA countries is of interest. Various types of indicators, which are differentiated in conformity with the plans of scientific and technical progress, are used by them. In industry of Bulgaria plan assignments on the introduction of scientific and technical achievements and advanced know-how are being used. In the GDR the tendency for the number of directive

indicators to decrease and the number of estimated, especially qualitative, indicators to increase is being observed. The level of mechanization and automation and the saving of time as a result of the fulfillment of the plans of science and technology and the measures on efficiency promotion are planned in accordance with the introduction of new equipment. The last indicator makes it possible to express the qualitative results of the scientific and technical achievements which are being introduced in production. During 1981-1985 all scientific and technical measures should ensure in the national economy of the GDR a saving of 2,854,000,000,000 hours of working time. This is equivalent to the annual available working time of 300,000 workers [4]. It is possible to give such an indicator in detail at enterprises up to the level of all the production subdivisions and to transform it into standard hours. Thus, a transitional unit is being established for the direct consideration of the influence of scientific and technical progress on the increase of labor productivity.

The basic task of the improvement of the mechanism of the planned management of scientific and technical progress also consists in linking the indicators of planning, financing and stimulation into a unified set, the components of which should be balanced according to standards. The set of planned and evaluation indicators of scientific and technical progress, which make it possible to carry out the comprehensive planning of operations over the entire chain: scientific research--design development--production and testing of the prototype--assimilation of the new equipment in series production, can constitute the basis of such a comprehensive set. The range of operations on new equipment with an indication of the time of completion, the economic impact, the technical level of production, the standard cost of operations and the cost of operations, which has been substantiated by technical and economic calculations, and the deductions for economic stimulation funds can be such comprehensive indicators. Along with the national economic impact of new equipment in the sphere of production and consumption the cost accounting impact, which finds expression in the decrease of the cost of the product (operations) and the increase of the profit of the enterprises which produce the new equipment, should also be planned at associations and enterprises.

It is necessary that the economic activity would be evaluated first of all on the basis of the fulfillment of the plan-programs and standards of the technical development of sectors and associations, the increase of the technical and economic level of production and the assimilation of highly efficient items and technological processes in the desired range. Proposals to change over on the basis of various standards to the differentiation of the annual plans themselves of the production and use of each technical item for the different stages of its series production: the periods of the assimilation and the distribution of the equipment, are also being advanced. The proposal to reflect in the plan of new equipment not only the development of new models or new series, but the entire period of the assimilation of this equipment, which will make it a fundamental and most important part of the production plan, is connected with this.

At the present stage the rapid development of intersectorial cooperation is a characteristic trait of the development of science and technology. The proportion of the internal scientific and technical potential, which is used

by union ministries, fluctuates within the range of 10-20 percent. Here the proportion of intersectorial operations is steadily increasing. It should not, however, be forgotten that a large portion of the scientific developments have for the present a purely sectorial affiliation. Meanwhile the development and assimilation of new generations of machines, fundamentally new technology, the results of basic scientific research, discoveries and inventions are, as a rule, of an intersectorial nature and require significant expenditures and the reorganization of production and cooperative relations. Thus, the complete automation of production, as world experience shows, is a result of the cooperation of the sectors of machine building and electronics and requires the corresponding scientific, technical and production experience in these areas.

The improvement and the broadening of the use of the method of goal program management is called upon to play a large role in the assurance of intersectorial scientific cooperation, which contributes for the formation of a unified technical policy and the increase of the efficiency of the goal orientation of scientific research and development. It is aimed at the solution of large-scale, intersectorial problems of socioeconomic development, and first of all of scientific and technical progress, and is conducive to their combined solution and the overcoming of departmental limitedness and organizational isolation. The positive experience in this area, which is connected with the implementation of programs on the development of atomic energy, space, industrial robots and others, should be developed and expanded.

Basic assignments on 170 scientific and technical programs, including 41 comprehensive goal programs which were formulated and approved by the USSR State Planning Committee, the State Committee for Science and Technology and the USSR Academy of Sciences, have been included in the plan of the 11th Five-Year Plan. Programs on the development of the fuel and power base, the rapid development of atomic energy, the development of fast reactors, the development of petroleum and gas deposits, the development and introduction of industrial robots and automatic manipulators, laser equipment and others are envisaged [6].

World experience shows that the "boundary" between science and technology, on the one hand, and production, on the other, is a quite special, most complex aspect of the reproduction process. "Research and development," it is noted in a work which was prepared by an international union of scientific societies, "are only the first stage of the process, and now the importance of the creation of a continuous chain through the introduction of innovations, which connects together scientific research, market research, inventions, the development of a model, equipment, the beginning of production and the delivery to the market of a new product, is recognized" [5].

History knows many examples, when the great importance and efficiency of scientific discoveries and inventions, which required large expenditures, were discovered only many years after these discoveries and inventions were made. History also knows many such instances, when large-scale expensive research and development did not yield a positive result. In other words, scientific research and experimental design work by its very nature always contains a large element of risk.

One of the most urgent tasks is to reduce this element to a minimum and to achieve the maximum efficiency. Under the conditions of state monopoly capitalism the vast network of scientific institutions, which is constantly being expanded and changes in its composition, is constructed according to the principle of the division of functions--state scientific institutes are turned primarily toward basic research; private (at present it is difficult to find a large monopolistic corporation which does not have its own scientific experimental base and in its management a special division for questions of scientific research and experimental design work) and combined scientific institutes are turned toward research of an applied nature.

The basic principles of capitalist practice in the sphere of scientific research and experimental design work are: a high degree of operational independence of scientific and experimental design institutions and at the same time vigorous and unremitting control on the part of financing institutions with allowance made for the prospects of sale and a profit.

Under the conditions of socialist production the improvement of the coordination of the activity of the subdivisions of the national economy and research and planning organizations at the intersectorial and national economic levels plays an important role in the creation of the organizational prerequisites for the acceleration of scientific and technical progress and the integration of science and production. As was indicated at the June (1983) CPSU Central Committee Plenum, it is necessary "to formulate such a set of organizational, economic and moral measures, which would interest in the updating of equipment managers, workers and, of course, scientists and designers...." The link of science with production is being strengthened first of all by the formation of production and scientific production associations, at present there are more than 4,000 of them in the country. Large scientific production complexes unite research, design and planning subdivisions, pilot works, capacities for the series and mass production of new equipment, subdivisions for adjustment, service and repair. The all-union industrial associations (VPO's) and the scientific production associations (NPO's) are called upon to become the basic units of the national economy, which independently solve scientific and technical problems. Such associations have great possibilities for the reequipment and modernization of production and are capable of producing technically advanced products and new equipment, which conforms to the highest requirements of scientific and technical progress.

Under present conditions comprehensive, interdisciplinary research, which is conducted at large research organizations, yields the greatest impact. Therefore, for the further improvement of the management of scientific research and experimental design work its concentration, the establishment of intersectorial problem research centers and complexes and the use at them of advanced organizational forms and structures are necessary.

The gradual spread of the practice of concluding economic contracts for operations, which are planned for introduction in the national economy, could contribute to the extension of the relations between academic and sectorial science and production. It is important that the recommendations of academic

institutes on introduction would be of an addressed nature and would be close to the specific needs of their use.

The improvement of the system of the financing of science and the development and introduction of technical innovations is an important conditions of the acceleration of scientific and technical progress.

It is well known that in recent years a policy of the overall decrease or, at least, the halt of the increase of the involvement of the state in the spending of the gross national product--first of all due to expenditures on social needs, on medical assistance and other types of social insurance--has been adopted in the United States, England, Japan and several other countries of monopoly capitalism. But given all the proposed changes or changes which are already being implemented, it is envisaged that the state financing of the sphere of scientific research and experimental design work not only will not be reduced, but, on the country, will increase. In Japan, for example, in spite of the urgent crisis of state finances, it is proposed during the 1980's to increase the total share of the expenditures on scientific research and experimental design work from 2 to 3 percent of the gross national product and to double the amount of state expenditures in it, as a result the amount of expenditures of the state will come to 50 percent of the total amount of expenditures for this purpose, which will bring Japan with respect to this indicator close to the United States and the countries of Western Europe.

Under our conditions the effectiveness of the influence of the system of financing and economic stimulation on the acceleration of scientific and technical progress depends on the methods of the planning and distribution of monetary resources, the extent of the spread of cost accounting financing and the efficient breakdown of investments by sources of financing and by levels of the management of scientific and technical progress. The changeover to the new forms of planning, management and stimulation and the increase of the economic independence of production units will ensure the possibility of the better use of their assets for the financing of scientific and technical progress.

The compensation of the enterprises and associations, which produce new equipment, for the socially necessary temporary increase of production expenditures should be obtained in the end by means of scientific and technical progress itself, that is, by means of the additional assets which the efficiency of the new equipment yields.

The lack of a mechanism of compensation for the increased expenditures of assimilation leads to the decrease of the indicators of production operations and decreases the interest of enterprises and associations in the updating of products.

The proposal on the formation along with sectorial funds for the development of science and technology of a centralized fund of basic research and intersectorial development, which is at the disposal of the State Committee for Science and Technology, merits attention. Such a fund could be used for the special-purpose financing of scientific and technical comprehensive programs of national economic importance and for the reimbursement of the

costs of the assimilation of new generations of equipment of an intersectorial nature, which would create favorable conditions for the accomplishment of major strategic tasks in the area of technical progress.

The streamlining of the financing of scientific research and experimental design work is a no less important problem. At present this work is financed from three basic sources: the state budget, the assets of ministries and in accordance with contracts with clients. Such a multiplicity of sources of financing complicates the organization of cost accounting at scientific research institutes and the mobilization of internal reserves of the increase of the effectiveness of expenditures. The provision of the corresponding organizations with their own working capital for the financing of work can contribute to the increase of this effectiveness. This will broaden the cost accounting independence of organizations, will increase the dependence of financing on the actual course of scientific research and experimental design work and will make it possible in a number of cases to reject the advance payment of expenditures from external sources.

The system of prices serves as an important component of the economic mechanism of the assimilation of new equipment and the evaluation of its quality and efficiency. When determining the limit wholesale prices (and for household appliances also the retail prices) for new items their technical level and efficiency are evaluated and interconnected.

For the purpose of the further increase of the influence of wholesale prices on the improvement of the quality of items and the acceleration of the assimilation of new highly efficient equipment and the replacement of obsolete equipment and for the purpose of the more efficient use of production resources and the decrease of the product cost the USSR State Committee for Prices with the participation of the USSR State Planning Committee, the USSR Ministry of Finance, the State Committee for Science and Technology and the State Committee for Inventions and Discoveries approved in December 1983 a new method.

The timely reduction of the prices for obsolete products, as well as the use of lower standards of profitability for such products in case of periodic revisions of the price lists serve as an effective economic stimulus of the introduction of more efficient equipment and technology. This will promote the increase of the relative efficiency of the technical innovations which succeed them. The introduction starting in 1983 of mandatory plan assignments on the decrease of the production cost (including the limit of material expenditures) in industry, construction and transportation is creating favorable economic conditions for the introduction of more efficient equipment which guarantees a decrease of production costs.

The solution of the problem of the stimulation of the developers, producers and users of new generations of machines presents particular difficulty. Unfortunately, the new method does not solve this problem. In the method it is stipulated that the wholesale prices for new highly efficient products are determined on the basis of the planned production cost of the first year of series production (with the exception of the expenditures, which are connected with the preparation and assimilation of products and are liable to

reimbursement from the Unified Fund for the Development of Science and Technology) and the level of the planned profitability of the producer enterprise for the year of the assimilation of the new equipment.

Such a practice makes the active influence of the user on the producer of equipment nearly impossible. The latter, on the basis of his departmental interests, strives to ensure with the least possible expenditures a profit of the sector, without considering the impact which is formed in the sector which uses his equipment. Thus, in spite of the repeated demands on the part of agriculture on the halt of deliveries of the T-40 tractor, industry up to now is producing it. As a result the rate of scientific and technical progress is decreasing, industry for the most part is directing its attention to the improvement of machines and equipment for traditional technological methods without the possibility of radical improvement and the search for fundamentally new technical solutions. This creates conditions, which increase the time lag of technical creativity, and leads to the development of "seemingly new" equipment, which obviously is at variance with the long-range goals of the socioeconomic development of the country. Therefore the mechanism of the setting of prices for new, highly efficient equipment should also ensure the corresponding interest of the consumer, who uses this equipment in his own technological process.

The development of new equipment and the modernization of the equipment being produced should always be connected with the decrease of the expenditures per unit of the useful work performed by means of it, while it is necessary to make the prices for such equipment directly dependent on its consumer properties. The assimilation of the production of new equipment in place of old equipment should not worsen the indicators of the activity of both the producer enterprises and the users.

The tasks, which face our country in the area of scientific and technical progress, are being accomplished on the scale of the world socialist community, in the process of the economic, scientific and technical cooperation of the fraternal countries and their economic integration. This cooperation is contributing to the acceleration of scientific and technical progress, the changeover of the economy to the primarily intensive means of development and the improvement of the sectorial structure of production. The multilateral long-term goal programs of cooperation in the area of energy, fuel and raw materials, agriculture and the food industry, machine building, industrial consumer goods and the development of transportation service are aimed at this.

The degree of the scientific and technical cooperation of the CEMA member countries within their economic integration has now already achieved a high level. More than 20 percent of the scientific and technical innovations, which have been introduced in these countries, are the product of such cooperation, in which approximately a third of their scientific and technical potentials is involved (in the small CEMA member countries these proportions significantly exceed the average indicators) [7].

The research and planning and design base of the socialist community (20 percent of all the patents for new equipment and technology, which have

been issued in the world) is powerful enough to solve independently the most difficult technical problems [8].

The directions of cooperation, which are connected with the further progress of science-intensive sectors, particularly the development of a new technology of the extraction and processing of raw material and energy resources, are acquiring greater and greater importance.

Today it is already legitimate to pose the question of the formation of a new, independent area of the cooperation of the CEMA countries: the joint introduction of the results of scientific research in production.

All this will contribute to the raising of the scientific and technical cooperation of the CEMA member countries to a new level, to the extension of mutual integration ties and thereby to the increase of the pace of the economic and social development of each of these countries and the entire world socialist community.

The acceleration of scientific and technical progress will ensure the further strengthening of the economic and defensive might of our country and the more complete meeting of the material and cultural needs of the people and will make it possible to take new steps in the direction of the creation of the material and technical base of communism.

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ORGANIZATION, PLANNING AND COORDINATION

GOAL PROGRAM MANAGEMENT OF SCIENTIFIC, TECHNICAL DEVELOPMENT

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA EKONOMICHESKAYA in Russian No 6, Nov-Dec 84 pp 41-46

[Article by N. I. Komkov: "Problems of the Methodology and Practice of the Goal Program Management of Scientific and Technical Development"]

[Text] In the article the practice of the use of the goal program management of scientific and technical development is analyzed, the advantages of this form of management as compared with traditional methods are identified and the possible means of its improvement are examined, measures, which are necessary for the conducting of an economic experiment on the development of systems and components of the organizational economic mechanism of goal program management, are outlined.

The formulation of the theoretical principles and methodology of the goal program management (PTsU) of scientific and technical development in our country began in the late 1960's. During this period the subject of the goal program management of scientific and technical development was determined, a system of basic concepts of goal program management, a classifier of programs, informational logical and mathematical tools, functional structural diagrams and the organizational conditions of the implementation of goal program management, including questions of the coordination of this form of management with the traditional methods of managing the solution of problems of the development of science and technology, were elaborated by the efforts of many researchers--V. N. Arkhangel'skiy, D. N. Bobryshev, G. M. Dobrov, Yu. A. Zykov, V. A. Irikov, A. K. Kazantsev, G. A. Lakhtin, O. I. Larichev, B. Z. Mil'ner, V. A. Pokrovskiy, G. S. Pospelov, F. K. Puzynya, M. P. Ring and others.

The procedural principles of the goal program management of the solution of problems of the development of science and technology ensure the unity of the analysis of the practice of using goal program management and the determination of the possible means of improving the systems of goal program management. They envisage the following sequence of the stage-by-stage designing of systems of goal program management:

1. the identification of the characteristic features of the problems being solved, the conditions of their comprehensive support and place in the hierarchical system of plans of the development of science and technology and the determination on the basis of the classifier of the type of programs in question;

2. the establishment for the found types of programs of the desirable level of the realization of the principles which are included in the standard list of principles of goal program management;

3. the determination of the composition of the stages and problems being solved, which are included in the full cycle of decision making in case of goal program management;

4. the choice of the methods of solving the problems of goal program management;

5. the breakdown of the standard composition of functions among the participants in the goal program management (the client, the main developer, the performer, the responsible performers, the coperformers) of the solution of the problem in question;

6. the choice of the planning and organizational forms of the interaction of the performers and coperformers of the operations on the program;

7. the establishment of the necessary composition of the information support of the management of the program, including the list and the sequence of the preparation of documents and the paper flow;

8. the choice of the information, computation and technical means of the implementation and the monitoring of the fulfillment of the decisions being made;

9. the preparation and issuing of standardized acts, which regulate the basic conditions of the interaction of the participants in goal program management and the procedure of coordinating the functioning of this system of management with the existing system of the management of scientific and technical development.

The effectiveness of goal program methods is achieved owing to the strengthening of the direct and inverse horizontal relations over the entire life cycle of the systems which are being studied, designed, developed and used [2]. This strengthening is ensured by the introduction of an organizational economic mechanism of the orientation of the goals, the planned results and the conditions of their achievement toward the meeting of the ultimate needs. According to the available estimates, which are based as well on the questionnaire analysis of many scientific and technical programs and assignments, the adequate use of goal program management makes it possible to shorten significantly the length of the research-development-application cycle. In addition to shortening the length of the innovation cycle, which, of course, also influences in the increase of the economic and social impact, the use of goal program management makes it possible to increase the technical

and economic level, to estimate reliably the necessary expenditures of manpower and material resources and others.

The analysis of the practice of formulating and implementing scientific and technical programs during the last and current five-year plans showed the following.

1. A specific system of the goal program management of scientific and technical development, which first of all includes the management of state (all-union) and sectorial programs, has formed in the country. One should add to them the republic and regional scientific and technical programs, which have been actively formulated in recent times. At the same time the scale and experience of the practical activity of the individual components of this system are unequal.

2. In the unanimous opinion of the scientists, developers, planning workers and representatives of ministries and organizations, who are participating in the goal program management of scientific and technical development, the practice of using goal program management as a whole is positive. It makes it possible first of all to shorten the time of the solution of scientific and technical problems by means of: a) the uniting within the program of the efforts of various ministries and departments; b) the orientation of the activity of many organizations and enterprises toward the ultimate goal of the elaboration and development of innovations; c) the creation of the planning and organizational conditions for the comprehensive support of the operations which are included in the program.

3. In many ministries and departments, organizations and enterprises the managers, planning workers, scientists and developers approach responsibly the questions of the preparation and selection of programs, regarding them as the leading component of the entire system of the management of scientific and technical progress. Systems of the effective monitoring of the fulfillment of all-union and sectorial scientific and technical programs have been developed at a number of organizations, scientific research institutes and higher educational institutions.

However, the established procedure of formulation and implementation has a large number of significant shortcomings, which frequently discredit the very idea of goal program management. Many principles, which are mandatory for goal program management, are not implemented at all or are fulfilled in part without the proper organizational and procedural support. In many instances they have merely been altered by program formulations of the traditional practice of drafting coordinating plans.

Thus, the rapid accomplishment of the most important socioeconomic tasks should be the initial thing for the substantiation and posing of scientific and technical problems. However, the negative practice of formulating programs "from the bottom" on the basis of the simple "adding up" of the suggestions of organizations and enterprises now obviously predominates.

There are no clear, logical interrelations between the goal of the program, which is frequently formulated in a quite general, vague form, and the set of

ultimate subgoals (assignments), which give it in detail, which eliminates the possibility of checking the degree of achievement of the goal. Therefore the situation, when all the assignments are fulfilled, but the goal of the problem being solved is not achieved, is quite realistic.

The procedural tools of the analysis of the need for the solution of socioeconomic problems and the formation of the composition of assignments make it possible to measure the degree of achievement of the goal of the program and to compare it with the conditions of the achievement of the ultimate subgoals (the degree of fulfillment of the assignments). Here the possibility exists to take into account the uncertainty when identifying the extent of the need for the innovations being elaborated and developed by the setting of some possible range of the boundary values of the need. Here such a lower estimate of the need, in case of which the development and production of innovations are economically efficient, is essential [2]. It is possible to use it as a certain "indicator" of the national economic advisability of the formulation and implementation of the given program.

The comprehensiveness of the goal and the composition of the ultimate subgoals from the point of view of the meeting of the initial need is an important condition, which ensures the advantages of goal program management as compared with the traditional methods of solving the problems of the development of science and technology. The "marketability" of the planned end results makes it possible without additional finishing touches and modifications to use them immediately in case of the circulation and use of innovations, which shortens significantly the length of the cycle of the materialization of scientific achievements. Here it is important at the stage of the formation of the composition of the subgoals and goals and the values of their technical and economic indicators to take into account the conditions of the "combination," the "incorporation" of innovations into operating technological processes. The disregard of this condition usually has the result that the potentials of the developed new equipment and technology are not fully utilized. The developers and managers of the programs and assignments, who have omitted a number of important and mandatory components at the stage of the preparation of the programs, are partially to blame for this.

In the opinion of many specialists, one of the mandatory principles of the success use of goal program management is the centralization of the management of the program in one organ and the centralization of the necessary resources in one source. Some dispute this principle, believing that under the conditions of a planned economy a well-formulated program should be linked with all the sections of the plan, the successful fulfillment of which ensures both the organizational planning and resource support of the work on the program. Practical experience has shown that for all-union, sectorial and especially regional and republic programs an effective system of their resource supply for the present has not been developed. The special-purpose financing, which has been adopted for all-union [3] and sectorial scientific and technical programs, is frequently violated and "does not reach" the specific performers. Capital investments are allocated not in the full amount and frequently with a great delay, which is one of the main causes of the postponement of the fulfillment of the assignments.

It is well known that one of the distinctive traits of the processes of solving scientific and technical problems is the existence of uncertainty with respect both to the values of the technical and economic indicators being planned and the innovations being developed and to the composition, cost and time of the fulfillment of the operations on the program. As domestic and foreign experience has shown, it is impossible to overcome this difficulty completely by the careful one-time (at the stage of the formulation of the program and five-year plans) study and coordination of all the components of the program.

At the same time the lack of a single organ of the management of the program as a whole and its assignments leads to significant irregularities and delays in the fulfillment of the nontraditional functions of the management of the formulation and implementation of programs by the existing organs and components of the system of the management of scientific and technical development. Thus, the prevailing system of the coordination and the reporting of the assignments and stages of the programs to the performers, as well as the system of the management of implementation do not always make it possible to identify in good time the irregularities in the process of their functioning. In the presently adopted system of the tracking of all-union programs the basic emphasis is placed on the enlistment of local organs of the center of scientific and technical information in the monitoring of the programs. The main performers of the assignments of the program not only do not have established systems of management, but in many cases even are not informed about the completion of the stages and the transfer of the results between performers within the assignment. The main reason here is the low responsibility of the managers of organizations and enterprises for the fulfillment of the assignments on the development and production of new equipment and the violation of the established procedure of statistical reporting. At present the main organization for the assignment is responsible only for "its own stages." It fulfills precisely them, the assignment as a whole might not be fulfilled.

Intuitive methods, which are frequently mistakenly called expert methods, dominate when preparing the programs and their assignments and determining the composition of the performers and coperformers, the values of the indicators of the cost, the time, the anticipated economic impact, the technical and economic level and others. Methods of information, economic and mathematical economic analysis are used only in limited cases. Meanwhile only logical unity and agreement between the extent of the need, the value of the anticipated economic impact and the technical and economic level, the cost and the time, which is monitored at all the stages of goal program management, can serve as a reliable guarantee of the advisability of the formation of a program from a national economic point of view.

The organizational procedural shortcomings of the processes of preparing the programs and their assignments have the result that in most cases the time of the fulfillment of the assignments and stages "blends" into a 5-year period, but is not calculated with allowance made for the interdependence of the indicators of the cost, resources and the anticipated economic impact. Therefore, during the final 2 years industrial and pilot experimental enterprises are overloaded with orders for the production and testing of

prototypes. As a consequence there are the inevitable lengthening of the time and the partial, and at times complete loss during embodiment in "metal" of the theoretically possible increase (as compared with the base version) of the values of the parameters of the technical and economic level, for the sake of which the innovation was developed and produced.

What are the basic reserves of the improvement of the practice of the goal program management of scientific and technical development? How is the real efficiency of this new, advanced form of planned management to be increased?

In our opinion, the improvement of the quality of the formulation and the management of the implementation of scientific and technical programs by the main developers is one of the main reserves of the increase of the efficiency of goal program management. Here first of all the precise observance by the participants in the process of the formulation and implementation of the programs of the basic ideas, principles and conditions of the adequate use of goal program management is important. Sectorial methods of goal program management, in which the basic provisions of goal program management would not be distorted and would not be "tuned" to the prevailing system and at the same time the specific nature of the management of the scientific and technical development of the sector would be shown, should be developed for this.

As experience shows, the assimilation and adoption (or rejection) of this form of management directly by the researchers, developers and producers of new equipment themselves should be considered the "key" unit in the improvement of the preparation of scientific and technical programs. Goal program management is not simply new planning forms. The technology of goal program management is first of all a different psychology, a new form of thinking of managers and developers, in which technical and technological, economic and organizational problems are closely interconnected. The traditional approach, in case of which the developer, having begun to perform work, waits for what "will come," then sees who might need "this," and, finally, calculates the economic impact, is unacceptable in case of goal program management. However, for many it proves to be difficult to change quickly and to reject such an approach. Often the change depends on the attitude of the management of ministries, departments, organizations and enterprises toward the new methods of management.

The analysis made of the systems of management at a number of sectorial scientific research institutes from the point of view of the evaluation of the degree of use in their activity of components of goal program management revealed a quite close connection between the completeness of the practical use of the components of goal program management and the level of the basic results of their scientific production activity. At a number of universities and leading higher educational institutions of the country (for example, Gorkiy State University imeni Lobachevskiy, the Moscow Institute of the Petrochemical and Gas Industry imeni Academician I. M. Gubkin) owing to the active stand of the management an obvious trend toward the changeover to goal program methods of the management of all scientific research activity has been noted.

Frequently it also happens the other way round, when the organs, which carry out the coordination of the scientific activity of a sector, an organization and others, assimilate the new methods of goal program management more rapidly than the management does. Here both the planning miscalculations and the organizational inefficiency of the managers are very clearly visible, since their timely supply with the information, which is necessary for making decisions in case of goal program management with its subsequent recording, makes it possible to give an objective evaluation of both the quality of its use and the quality of management.

The adaptation of the prevailing system of the planning of the development of science and technology at the state and sectorial level to the peculiarities of the special-purpose management of the entire cycle of scientific and technical development can be considered another important direction of the improvement of the practice of the goal program management of scientific and technical development. During the past two five-year plans the USSR State Planning Committee and the State Committee for Science and Technology took numerous steps on the "implantation" of the ideas and methods of goal program management in the methodology and technology of the drafting of plans of the development of science and technology. This has yielded unquestionable gains. The decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy" [1], which was adopted on 18 August 1983, specified the structure of the basic types of scientific and technical programs and a list of the basic directions of the improvement of their formulation and implementation. For the successful fulfillment of the measures outlined by the decree it is necessary to conduct a number of large-scale experiments on the development of the systems and components of the organizational and economic mechanism of goal program management. In particular, there should be checked under real conditions the suggestions on:

a) the improvement of the mechanism of the choice of problems for the subsequent program organization of their fulfillment;

b) the organization of the procedure of the order of programs on the basis of the analysis of the needs for the solution of key problems for groups of sectors, which are associated through the processing method, with the transfer to the State Committee for Science and Technology of the functions of the client;

c) the organization on a competitive basis of the elaboration of versions of programs and their assignments by different developers;

d) the organization of an extradepartmental, qualified commission of experts, the purpose of which should be not only the fulfillment and the recommendation of elimination of obviously unpromising solutions, as well as the provision of the necessary procedural assistance in improving the proposed versions of programs;

e) the assurance of the centralized financing and material and technical supply of all-union programs, the timely allocation of limits of capital

investments for facilities which are being built in accordance with the assignments of programs;

f) the technology of the coordination of the requirements of the resource supply of all-union programs with the basic sections of the national economic plan;

g) the organization of systems of the management of the implementation of the programs of the development of science and technology on the basis of the main developer of the program and the main developers of the assignments of the program;

h) the organization, at the stage of both the formulation and the implementation of the programs, of temporary collectives of performers of the operations with their direct subordination to the main developer of the assignment;

i) the organization of automated problem-oriented information support systems of the managers of the programs and assignments, which make it possible to carry out the checking, analysis and specification of the basic characteristics of the programs in dialogue mode;

j) the introduction of a standard procedure of the acceptance and transfer of the completed results of the fulfillment of the stages, the assignments and the program as a whole;

k) the composition and content of the standard documents, which regulate the procedure of the appointment, the rights and duties (and obligations) of the managers of the programs and assignments and the responsible performers.

The listed measures can be regarded as an initial list of the operations on the improvement of the goal program management of scientific and technical development under the conditions of the conducting of the test of theoretically substantiated versions of the formation of individual components of the organizational and economic mechanism of goal program management.

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CSO: 1814/53

ORGANIZATION, PLANNING AND COORDINATION

UKRAINIAN CONFERENCE ON PLANNING, MANAGEMENT OF MACHINE BUILDING

Kiev TEKHNOLOGIYA I ORGANIZATSIYA PROIZVODSTVA (PERIODICHESKIY NAUCHNO-PROIZVODSTVENNYY SBORNIK) in Russian No 2, 1984 p 58

[Article by S. I. Radomskiy: "The Republic Conference 'Problems of the Improvement of the Planning and Management of Machine Building Production'"]

[Text] The conference was organized by the Ukrainian SSR Ministry of Higher and Secondary Specialized Education jointly with the Voroshilovgrad Machine Building Institute, the Ukrainian Republic Board and the Voroshilovgrad Oblast Board of the Scientific and Technical Society of the Machine Building Industry, the Voroshilovgrad Intersectorial Territorial Center of Scientific and Technical Information and Propaganda and the Voroshilovgrad Affiliate of the Institute of Industrial Economics of the Ukrainian SSR Academy of Sciences. It was held in Voroshilovgrad.

V. A. Zvonov, prorector for scientific work of the Voroshilovgrad Machine Building Institute, opened the conference. V. N. Goncharov, head of the Chair of the Organization and Planning of Production of the Voroshilovgrad Machine Building Institute, delivered the report. An analysis of the work done in the republic on the fulfillment of the decisions of the 26th CPSU Congress, the November (1982) and June (1983) CPSU Central Committee plenums, which are aimed at increasing the efficiency of planning and management, was given in his report. The speaker stressed that the improvement of the system of the planning and management of production is regarded by the party and government at the present stage as one of the basic means of the more complete use of the advantages and possibilities of the economy of mature socialism for the assurance of the successful accomplishment of the tasks of building communism.

Scholars and scientists of higher educational institutions of the Ukrainian SSR and scientific research institutions and organizations and economists of industrial enterprises took part in the conference.

The scholars Professor O. A. Orlov (Khmelnitskiy), Professor O. A. Turovets (Voronezh) and Professor Yu. A. Kulikov (Voroshilovgrad) and leading economists of industrial enterprises and institutions addressed those who had gathered.

Practical recommendations on the implementation of a set of measures, which are aimed at the further development of the theoretical principles of the planning and management of machine building production, the strengthening of the procedural and organizational base of management activity and the acceleration of the complete reform of the economic mechanism, were elaborated.

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CSO: 1814/59

ORGANIZATION, PLANNING AND COORDINATION

COORDINATING COUNCIL FOR STANDARDIZATION IN MACHINE BUILDING

Moscow STANDARTY I KACHESTVO in Russian No 10, Oct 84 p 14

[Article: "On the Reorganization of the Coordinating Council Attached to the All-Union Scientific Research Institute of Standardization in Machine Building"]

[Text] The Intersectorial Coordinating Council for the Introduction and Development of the Unified System of Technological Production Preparation attached to the All-Union Scientific Research Institute of Standardization in Machine Building was established in 1975 by a joint decision of the State Committee for Standards and the machine building ministries. Executives of the main organizations for standardization, technological institutes, associations and enterprises of machine building and representatives of the State Committee for Standards and its territorial organs became members of it.

The coordination of the activity of the All-Union Scientific Research Institute of Standardization in Machine Building, the territorial organs of the State Committee for Standards and the sectors of machine building on the introduction and development of the Unified System of Technological Production Preparation was the task of the council. During 1975-1982 the council actively promoted the introduction of the Unified System of Technological Production Preparation in all the sectors of machine building, performed work on the promotion and dissemination of the experience of the leading sectors and enterprises and took part in the preparation of 26 collections of the series "The Experience of the Introduction of the Unified System of Technological Production Preparation," which were published by the Standards Publishing House.

The tasks, which were posed by the party and government during the 11th Five-Year Plan on the increase of the efficiency of social production, the acceleration of scientific and technical progress, the assimilation of new types of products and the saving of manpower and material resources, required the further development of standardization in the area of machine building. The need arose to cover by standardization all types of machine building products at all the stages of the life cycle of items--from scientific research, designing and production to operation and repair on the basis of the complete standardization of products and the automation of engineering operations and production processes.

For the accomplishment of these tasks the State Committee for Standards carried out the reorganization of the coordinating council and broadened its functions. Representatives of scientific and planning and design organizations and higher educational institutions and executives of a number of scientific production associations and enterprises were made members of the council. Two sections--the standardization of products and the technical level of production--were organized under the council. The State Committee for Standards approved the staff and presidium of the council, the statute on the council, as well as its new name--the Intersectorial Coordinating Council for Standardization in Machine Building attached to the All-Union Scientific Research Institute of Standardization in Machine Building.

The basic task of the council is the coordination of the work in the area of the increase of the scientific and technical level of the standards for machines, equipment and instruments, the introduction in them of qualitative indicators, norms and requirements on the decrease of the materials-output ratio, the decrease of the consumption of fuel and power and the increase of labor productivity and the reliability of items and the assurance of the complete standardization of products.

The development of standardization in machine building for the purpose of creating the conditions for the organization of specialized works and the extensive use of the complete automation of production processes, as well as the development and improvement of intersectorial general technical systems of standards, which ensure the extensive use of the advanced know-how of industry, including on the organization of designing and the preparation of production, are an important direction of the work of the council.

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CSO: 1814/59

BUDGET AND FINANCE

CALCULATION OF EFFECTIVENESS OF EXPENDITURES ON SCIENCE

Tashkent EKONOMIKA I ZHIZN' in Russian No 9, Sep 84 pp 69-71

[Article by Z. Salokhiddinov, scientific associate of the Institute of Economics of the Uzbek SSR Academy of Sciences: "Some Questions of Improving the Determination of the Economic Effectiveness of Expenditures on Science"]

[Text] Each year in the country about 4,000 descriptions of new models of machines, equipment, apparatus and instruments are developed, tens of thousands of sections, shops and works are completely automated and mechanized. According to the calculations of the Scientific Research Institute of Labor, not less than 75 percent of the increase of labor productivity is provided by the increase of the technical level of production.

The introduction of new equipment and the implementation of measures on the scientific organization of labor in 1971-1975 provided 52 percent of the total increase of labor productivity in industry, in 1976-1980--93 percent and in 1981-1982--the entire increase.

An economic impact of 16-18 rubles is created in the national economy for every ruble of expenditures on inventions and efficiency promotion.

According to far from complete estimates, as a whole every ruble of expenditures on science yields a return of 5-6 rubles.

The practical calculation of the output-science ratio in the republic is carried out in accordance with "The Procedural Statute on the Determination of the Economic Efficiency of Applied Scientific Research Work."

The procedure of calculating the share of science in the total amount of the economic impact, which was actually obtained (but was not anticipated or planned) after the introduction in production of the results of scientific research work, is presented in it.

The gained experience makes it possible to "probe" the end results of the "research--production" cycle and shows the correctness and effectiveness of the chosen means in the matter of the economic evaluation of the activity of scientific institutions, design bureaus and pilot experimental subdivisions of the system of the Uzbek SSR Academy of Sciences.

Meanwhile the constant improvement of the economic mechanism and the choice of more practicable and accessible criteria of the efficiency of the measures being implemented and the current and one-time expenditures being made are characteristic of every economic system.

It seems to us that the established procedure of recording and analyzing the components of the output-science ratio does not completely satisfy present requirements. The economic services of scientific institutions are poorly developed, the recording of the total expenditures (current and one-time), which constitute the denominator of the function of the output-science ratio, has not been properly organized everywhere, the concepts of economy, impact, efficiency, prevented harm and so forth are frequently equated with each other.

All this is causing the need for the further improvement of the choice of the indicators of the output-science ratio and the indicators of the determination of the absolute effectiveness of the current and one-time expenditures on science.

1. At present the output-science ratio ($Э_н$) in the system of the Uzbek SSR Academy of Sciences is determined in the following manner:

$$Э_н = Э_ф : З, \quad (1)$$

where $Э_ф$ is the share of the actual economic impact which is attributable to science, thousands of rubles;

З is the current expenditures, thousands of rubles.

The study of the question showed that in the structure of current expenditures scientific equipment worth a large amount, a large portion of which is in operation for several years, is purchased annually.

In conformity with the Statute on Accounting Reports and Balances, which was approved in June 1979, instruments, means of automation and laboratory equipment worth 300 rubles and more per unit, which were purchased by scientific research organizations (including organizations which are production and structural units of associations), as well as by associations and industrial enterprises for central plant laboratories, are assigned to the fixed capital. The cost of this category of scientific equipment is repaid by depreciation, on the basis of their standard service life. Thus, the sum of the cost of the scientific equipment, which is not grouped with inexpensive and quickly wearing items, should be excluded from the current expenditures of the year under review and they should be taken into account within the fixed capital.

2. As is known, both living labor and the past labor, which is embodied in fixed and working capital, are involved in the process of scientific research and experimental design work. The value alone of the fixed capital of the scientific institutions of the natural and technical type of the system of the Uzbek SSR Academy of Sciences as of the beginning of this year came to about 150 million rubles. Meanwhile in the established practice of recording current expenditures, that is, when establishing the denominator of the function of the output-science ratio, these large amounts of past labor, which is embodied in fixed capital, remain outside the field of view.

Apparently, specialists proceed from the fact that with respect to the fixed capital of budget-carried organizations, as well as the fixed capital of scientific research and design organizations, which have been changed over to cost accounting, depreciation is not credited and the scientific subdivisions, being an intermediate unit and an indirect source of the creation of material wealth, do not have their our sources of reimbursement and, consequently, their assignment to the current expenditures of the year under review.

However, the fixed capital, while actually being involved in the process of the creation of the scientific product and being in constant use, gradually wears out and loses its initial value and with the expiration of the service life is completely written off.

Therefore, in our opinion, the ratio of the annual economic impact (the share of science) to the amount of the current expenses, which caused this impact, and the value of the fixed capital, which has been adjusted to an annual scale in conformity with the norms of wear, should serve as a more reliable criterion of the effectiveness of the expenditures on scientific research and experimental design work.

In this case with allowance made for the conditions, which were presented in paragraph 1, the formula of the output-science ratio will have the following expression:

$$Э_н = \frac{Э_ф}{(З - С_{но}) + \overline{\Sigma}_и(Ф + С_{но})} \qquad (2)$$

or

$$Э_н = \frac{Э_ф}{(З - С_{но}) + \frac{Ф + С_{но}}{Т_н}} \qquad (3)$$

where $С_{но}$ is the value of the scientific equipment which is being attributed to the category of fixed capital;

$\overline{\Sigma}_и$ is the average weighted standard coefficient of the wear of fixed capital;

$Ф$ is the value of the fixed capital which is reckoned in the balance of scientific institutions and organizations, thousands of rubles;

$Т_н$ is the standard service life of the fixed capital, in years.

The actually credited amount of wear of the fixed capital during the year under review should correspond to the content of the expressions: $\overline{\Sigma}_и(Ф+С_{но})$ or $(Ф+С_{но})/Т_н$, which will make it possible to check the correctness of the accounting of the wear and the annual writing off of the value of the fixed capital.

The content of formulas 2 and 3 encompasses most completely the aggregate expenditures of scientific institutions and organizations and conforms most reliably the the present conditions of management: the achievement of the maximum

impact with the minimum total adjusted expenditures. The recommended formula synthesizes all the components of the expenditures: the material expenditures, the expenditures of living labor and a certain portion of the one-time expenditures (fixed capital), which have been adjusted to an annual scale in conformity with the norms of their wear.

3. For the thoroughness of the analysis and the identification of the reserves of the increase of the effectiveness of the expenditures on science it is advisable to use in practice the calculation and the study of the dynamics of such synthetic indicators as: the output-capital ratio, the yield of the active components of the fixed capital, the capital-labor ratio, the machine-worker ratio and labor productivity of scientists.

a) The output-capital ratio at scientific institutions and organizations is calculated (Φ_o):

$$\Phi_o = \frac{Э_\Phi}{\overline{\Phi}} \qquad (4)$$

where $\overline{\Phi}$ is the average annual value of the fixed capital, thousands of rubles.

The practical calculation of the output-capital ratio in individual cases may be complicated by the fact that a number of scientific institutions (organizations) or individual subdivisions of them may be located in the same building. In case of such a situation the determination of the share of organization (subdivision) i in the fixed capital, which is in operation of p organizations ($i = 1, 2, 3, \ldots, p$), should be specified in the following sequence:

$$y_c = \frac{\sum_{i=1}^{n} \overline{\Phi}i}{\sum_{i=1}^{n} Oni}; \qquad (5)$$

where y_c is the unit value of 1 m^2 of area of fixed capital, rubles;

$\sum_{i=1}^{n} \overline{\Phi}i$ is the average annual value of fixed capital, which is occupied by organizations (subdivisions) i, thousands of rubles;

$\sum_{i=1}^{n} Oni$ is the total area of fixed capital, which is occupied organizations (subdivisions) i, m^2.

Further:
$$\overline{\Phi}i = Oni \cdot y_c; \qquad (6)$$

where $\overline{\Phi}i$ is the proportion of the average annual value of the fixed capital, for which organization (subdivision) i accounts, thousands of rubles;

Oni is the actually occupied area (basic and auxiliary area, including corridors) of organization (subdivision) i, m^2.

b) The yield of the active components of the fixed capital $\Phi_{a(o)}$:

$$\Phi_{a(o)} = \frac{Э_{\Phi}}{\overline{\Phi}_a} \qquad (7)$$

where $\overline{\Phi}_a$ is the average annual value of the active components of the fixed capital, thousands of rubles.

c) The capital-labor ratio of scientists ($\Phi_в$):

$$\Phi_в = \frac{\overline{\Phi}}{\overline{P}_н} \qquad (8)$$

where $\overline{P}_н$ is the average annual number of scientists, people.

d) The machine-worker ratio of scientists $\Phi_{a(в)}$:

$$\Phi_{a(в)} = \frac{\overline{\Phi}_a}{\overline{P}_н}\ ; \qquad (9)$$

e) Taking into account the lack of the complete possibility of the value or quantitative evaluation of the results of scientific research at all scientific institutions and organizations and for the purpose of not allowing disagreement in the choice of criteria it is proposed to calculate the labor productivity of scientists as the efficiency of the functioning of living labor ($Э_р$):

$$Э_р = \frac{Э_{\Phi}}{\overline{P}_н}\ . \qquad (10)$$

In our opinion, the proposed measures will make it possible to evaluate more realistically the effectiveness of the expenditures on science and will contribute to the increase of the efficiency of scientific research and the strengthening of the connection of science and production.

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CSO: 1814/58

BUDGET AND FINANCE

ECONOMIC MEASUREMENTS IN MANAGEMENT OF SCIENTIFIC, TECHNICAL PROGRESS

Moscow EKONOMIKA I MATEMATICHESKIYE METODY in Russian Vol 20, No 4, Jul-Aug 84 (manuscript received 25 Jan 84) pp 601-613

[Article by D. S. L'vov (Moscow): "Unified Principles of Economic Measurements in the Management of Scientific and Technical Progress"*]

[Text] At the December (1983) CPSU Central Committee Plenum it was stressed that the choice of the most efficient directions of the development of the national economy and the main units, which make it possible to advance the economy of the country quickly along the intensive path, is one of the ripe tasks of the improvement of planning and management ["Materialy Plenuma Tsentral'nogo Komiteta KPSS. 26-27 dekabrya 1983 goda" [Materials of the CPSU Central Committee Plenum. 26-27 December 1983], Moscow, Politizdat, 1983, p 21]. In this connection the increase of the level of the scientific substantiation of the methods of evaluating the effectiveness of capital investments and new equipment and their extensive introduction in management practice are acquiring particular importance. This is due to a number of reasons.

First, at present in the general technology of drafting national economic plans for the present proper attention is still not being devoted to such an important stage as the preplanning substantiation of the decisions being made and the inclusion among the measures being planned for implementation of the most effective ones from a national economic point of view.

Second, the cost accounting efficiency of associations and enterprises agrees not always and not in everything with the national economic efficiency.

Third, there are more than 10 official methods on the determination of the effectiveness of capital investments and new equipment, in which the means of calculating the economic impact for the national economy are interpreted differently, the values of the standards being used, the group of indicators being taken into account and others are also different. Here the fact that the real expenditures on the building of projects and the implementation of measures frequently prove to be significantly greater than their estimated values, is causing particular anxiety.

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*For purposes of discussion.

The indicated factors are a consequence of the inadequate elaboration of a general theory of economic measurements, which is equal to mature socialism. Meanwhile, the economy, like any area of human activity, has its own set of "measures and weights," which make it possible to reduce to "a common denominator" the expenditures of various types of production resources and to compare these expenditures with the useful result, in other words, to determine their national economic efficiency. Hence, too, follows the task of elaborating a unified system of coordinated methods of economic measurements in the national economy. Economic standards serve as the load-carrying structure of such a system.

1. Economic Standards: Their Essence and Purpose

The entire system of economic measurements under the conditions of a planned economy is based on centrally established long-term economic standards. V. V. Novozhilov [1], A. L. Lur'ye [2], A. L. Vaynshteyn and L. V. Kantorovich [3] made a great contribution to the elaboration of the methodology of their substantiation. Subsequently these problems underwent development in [4-7 and others].

An important peculiarity of the study of the indicated problem at the present stage is the fact that it is regarded as a component and inseparable part of a more general task--the formation of the optimum national economic plan. In the process of its drafting the refinement of the initial system of indicators and standards should occur and their new values should be specified. In this sense the plan and the standards are a unified whole. The latter act as kinds of carriers of the aims of the plan. This approach differs substantially from the traditional approach, which is used widely in the practice of the economic substantiation of the versions of capital construction and new equipment.

Thus, in "The Standard Method of Determining the Economic Effectiveness of Capital Investments" [8] and in "The Method (Basic Provisions) on the Determination of the Economic Efficiency of the Use in the National Economy of New Equipment, Inventions and Efficiency Proposals" [9] the values of the standards of the effectiveness of capital investments $E_н$ and of adjustment according to the time factor $E_{нп}$ are postulated, and it is not indicated how the numerical values were obtained. In [8] $E_н$ is taken to be equal to 0.12, while $E_{нп}$ is taken to be equal to 0.08, in [9] they are taken to be equal respectively to 0.15 and 0.1. Here whereas in [9] a unified norm of effectiveness without regard for the sectorial affiliation of the measure being implemented is receommended, in [8] differentiated standards are recommended: for industry--0.16, agriculture--0.07, transportation and communications--0.05, trade, procurement and material and technical supply--0.25 and so on. In the last case the "value" of the same ruble of investments can differ by two-, three- and even fivefold depending on where this ruble is used.

In contrast to the indicated statement in [5, 7] the standards of the efficiency of the use of production resources (not only capital investments, but also manpower) are defined as the parameters of the production function of the national economy, which links the value of the produced national income (Y) with the amount of operating productive capital (F) and labor (L), where L is is the average annual number of those employed in the physical sphere

$$Y_t=Y(F_t;\ L_t,\ t). \tag{1}$$

The dependence of Y on time (t) reflects the influence of the factors of the increase of the national income, which are not directly connected with the increase of the amounts of the resources being used.

In the proposals on the differentiability and local linear homogeneity there follows from (1) the ratio between the increase of the national income (ΔY) over a quite short period of time (Δt) and the increase of the productive capital (ΔF) and number of workers (ΔL) during the same period

$$\Delta Y=\frac{\partial Y}{\partial F}\Delta F+\frac{\partial Y}{\partial L}\Delta L+\frac{\partial Y}{\partial t}\Delta t. \tag{2}$$

In the theory of optimum planning the values $\partial Y/\partial F$ and $\partial Y/\partial L$ are defined as the standards of efficiency of the use of productive capital (E_H) and manpower resources (E_{HV}). Consequently,

$$\Delta Y=E_H\Delta F+E_{HV}\Delta L+\frac{\partial Y}{\partial t}\Delta t. \tag{3}$$

Each of the named standards shows by how many units the increment of the national income increases due to the increase of the corresponding resource per unit in case of a fixed amount of the use of the other.

The first two terms of (3) signify the increase of the national income due to the increase of the amount of production resources being used, the third term reflects the change of the national income as a result of the better use of production resources during the period in question, by which this was initially planned in conformity with the standards which were established for this time interval. In essence, this is the increase of the national income, which is directly connected not with the increase of the amounts of resources, but with the obtaining of an additional above-standard impact from each unit of them. That is why the third term, in our opinion, can be identified with the use of more advanced means of production, which increase the productive force of labor, effective forms and methods of organization and management, that is, everything that is included in the broad interpretation of scientific and technical progress.

Then the overall increase of the national income will be formed from the increase, which is proportionate to the amount of resources, which are used in conformity with the established standards, and the above-standard increase, which is obtained by greater efficiency as compared with the efficiency which corresponds to them. Therefore, we will identify the standard increase, which is achieved by the increase of the amount of resources being attracted, with extensive growth ($\Delta Y_э$), and the above-standard increase, which follows from the increase of the yield from each unit of them, with intensive growth ($\Delta Y_н$), that is,

$$\Delta Y=\Delta Y_э+\Delta Y_н. \tag{4}$$

The interconnected procedure of "adjusting" the standards in question to the increase of the proportions of the intensive factors of economic growth reduces to the following:

on the basis of the aims of the plan the growth rate and average values of: the national income, the productive capital, the number of those employed in physical production and their wage fund, are determined for the next planning period;

the values of the indicated indicators during the preplanning period are calculated. Here it is taken into account that the actually achieved values of the national economic indicators might not coincide with those which were adopted as planning indicators. At the same time it is presumed that this did not lead to a deviation of the actual average effectiveness of capital investments for the period under review from the base planning standard. Such an assumption gives grounds to use in the calculation of the planning standards E_H and E_{HV} their base values;

on the basis of the initial value E_H^0, as well as the above-indicated average and rate indicators of economic growth, which pertain to this period, the proportion of the increase of the national income due to intensive factors is determined;

a prediction of the estimated indicator of intensification for the planning period is made;

in accordance with the parameters of economic growth, which are given by the five-year plan, the planning values of the economic standards E_H and E_{HV} are calculated.

The general algorithm of the calculation of the planning standards E_H and E_{HV}, which was formulated by V. G. Grebennikov, Yu. V. Ovsiyenko and S. M. Movshovich, was used when preparing the draft of the comprehensive method of evaluating the efficiency of economic measures [10, 11]. According to the indicators of the 11th Five-Year Plan the estimated value of the indicated standards came respectively to 0.1 and 0.14 [11].

In this statement the value of the standard of efficiency of the use of production resources is not given a priori with respect to the plan, but is determined directly by its macroeconomic indicators. When evaluating and selecting the best version of the plan one must not extend to the planning period the past conditions, which previously determined the standards of efficiency, even if their their calculation was made correctly.

With respect to their essence and method of calculation the planning standards of efficiency of the use of production resources are common for all sectors of the national economy. In [4, 5] it is shown that the leveling of the standards to a common level ensures the maximum increase of the efficiency of social production as a whole.

However, it is still possible to hear frequently the objections that a common norm of efficiency does not agree always and in everything with the principles

of goal orientation and priority in the development of sectors. Indeed, a certain amount of investments is distributed in the plan according to the conditions of immediate necessity--so-called mandatory measures. But, in principle, their number is relatively small. It, apparently, cannot have an appreciable influence on macroeconomic indicators, since the decrease of the yield from the implementation of a specific portion of such measures is offset by a deliberately larger number of those which ensure an increase of the economic efficiency of production. It should also be borne in mind that the present level of technology affords the designer quite extensive opportunities in the choice of such a version of production, which makes it possible to implement the mandatory measure not with a decreasing, but with an increasing effectiveness of investments. It is merely important that when accomplishing the posed task we would not proceed from the established, in a number of cases backward conditions of production, but would use the most economically advanced organizational and technological methods, which are presently available in our country or abroad.

The implementation of these methods ensures the minimum total production costs. And it is entirely a question only of the proper comparison of the different expenditures of resources. For this the method of adjusted expenditures was used in technical and economic calculations, starting back with the plan of the State Commission for the Electrification of Russia. The comparison of the current and one-time expenditures in the unified indicator of the annual adjusted expenditures was carried out by means of the same unified norm of the effectiveness of capital investments (E_H).

In his time V. V. Novozhilov formulated a model of current (annual) national economic planning [1], from which the following interpretation of the standard of effectiveness E_H follows--it shows by how much the amount of current expenditures will decrease, if the limit of capital investments is increased by a unit, that is, what the norm of the replacement of current expenditures with capital expenditures is.

In [5] it is proven that the standard of the replacement of current expenditures with capital expenditures at the same time is the standard of the maximum economic "yield" of capital investments in the increase of the national income. Therefore the introduction of E_H in the indicators of the adjusted expenditures makes it possible to take into account the national economic demands on the effectiveness of the capital investments being used.

In [8] the need for the differentiation of the standard of the effectiveness of capital investments is substantiated by the differences of the cost accounting conditions of the functioning of economic objects. Therefore they believe that the demandingness on the effectiveness of capital investments should be different: greater wherever the profitability is higher, and less wherever it is comparatively low. It turns out that significantly more is expected from whoever works well and provides a large additional increase. Stimuli for the exceeding of the standards of the efficiency of the use of the corresponding production resources, which have been established by the plan, are thereby not created.

Apparently, the differences between the two functions of economic standards--the measuring function and the cost accounting, or stimulating, function--are not taken into account here. In our opinion, the measuring function, which establishes the minimum permissible demands on the effectiveness of the use of capital investments, without the assurance of which there will be no optimum national economic balance and planned rates of economic growth, should be the initial and decisive function of planning standards.

It is frequently believed that the differentiation of the standard is needed not only in connection with the principles of cost accounting. It is also necessary with respect to social, ecological and other demands. The consideration of the social and other goals of the development of production should be an indispensable condition of the economic substantiation of planning and design decisions. But calculations of this sort should be made on the basis not of the "adjustment" of the standard coefficient, but of the use of a unified norm of efficiency. In individual instances the introduction of new equipment can also yield a negative economic impact. And if the implementation of such equipment is dictated by social or other special demands, the negative value of the economic impact will show how much the implementation of new equipment, where this proves necessary for reasons of the immediate accomplishment of the goal indicators of the plan, costs society.

At present hardly anyone will object to the use of a unified norm of efficiency in case of the economic substantiation of long-term planning and design decisions. The differences here concern mainly whether the standard of the effectiveness of capital investments coincides with the standard of the adjustment (discounting) of expenditures at different times.

In [5, 6] it was shown that only one indicator, by means of which the adjustment of expenditures at different times and the comparison of current expenditures with capital expenditures are carried out, is established in the model of long-term planning, which was formulated by L. V. Kantorovich.

When examining the problem of economic standards, one should dwell specially on the reflection of the efficiency of labor activity. What must one bear in mind here? The standard of the efficiency of labor should not be identified with the set contributions to the state budget by enterprises to finance social insurance benefits, which take into account the expenditures from public consumption funds. A certain inaccuracy, it seems to us, is being permitted in this matter.

In recent times the point of view, according to which it is necessary to take fully into account among the adjusted expenditures the benefits and payments, which workers receive from public consumption funds, has become more and more widespread. For this it is proposed to introduce an additional (in excess of the standard) extra charge on wages. It is clear that this will lead to an appreciable increase of the influence of the labor factor, which might change not only the value, but also the sign of the indicator of the economic impact, which is determined according to the difference of the adjusted expenditures.

In individual cases the versions of the mechanization and automation of production, which were previously deemed inefficient, now, taking into account the corrections for the significance of the labor factor, are proving to be efficient. It is clear that the proper consideration of the efficiency of the use of manpower resources is of great importance for the choice of the best versions of planning and design decisions.

Manpower is a resource of a special type. The efficiency of the use of this resource can be greater or less than the immediate expenditures on its reproduction. Moreover, it is very significant that the expenditures on the reproduction of any resource should be proportionate or equal to its contribution to the increase of production efficiency [12].

Meanwhile, a certain portion of the expenditures on the reproduction of manpower is being distributed without regard for this contribution, for example, the expenditures for health care, retirement security, stipends, school education and so on.

But does this mean that only the wage should be taken into account in the expenditures of production? No, it would be incorrect to do that. The standard of the efficiency of labor activity is greater than the remuneration of labor. The calculations made at the Central Institute of Economics and Mathematics show that at present the amount of this excess comes to approximately 14-16 percent, that is, is close to the prevailing contributions for social insurance.

The standards of the efficiency of the use of natural resources play a significant role in the economic management of production. Standards of this sort are called upon to reflect the minimum permissible economic yield from the use of the corresponding natural resources and at the same time the socially justified limit of expenditures on their saving (improvement and reproduction). These standards are viewed as the difference between the value of the products of the sectors, which use nature, and the standard (adjusted) expenditures on the assimilation and use of the natural resource which is being evaluated. Here the value of the products of the sectors, which use nature, is calculated in the so-called inclusive expenditures on the corresponding types of raw materials or fuel. Studies [13 and others] have made a large contribution to the elaboration of this problem, although for the present it is impossible to consider them completed, particularly with respect to the substantiation of the methods of calculating rent payments. This is also leaving its mark on the level of reliability of the economic standards of capital investments and manpower resources, which were discussed above.

2. The Economic Measurement of the Results of Production

The comparison of the expenditures and results at the most different levels of the making of economic decisions is accomplished by means of prices. The properly established price for the final product, for the consumed raw materials, materials, tools of labor and so on is a guarantee and a necessary condition of the adequate evaluation of the economic efficiency of any economic measure, from the implementation of an efficiency proposal to the selection of the construction site of a large enterprise. The prevailing list

prices meet this condition not always and not in everything. This is connected with the fact that many problems, which are not directly connected with the evaluation of the economic efficiency of economic measures: the reflection in prices of socioeconomic factors, which determines the different level of wholesale and retail prices; the preferential (reduced) level of the standards being taken into account when establishing the prices for individual types of products and services, which are most important for the population, and so on, are solved by means of them. Moreover, it is necessary to take into account the discrepancy between the stable level of list prices and the real dynamics of the expenditures.

It is also important to bear in mind that the prevailing wholesale prices also do not reflect a number of other factors which influence their deviation from the level of the socially necessary expenditures. At present the developed system of payments for the national economic resources being used is not taken into account in the prevailing prices. The level of prices shows mainly only the change of the current production costs, that is, the cost of the output being produced.

This leads to certain distortions in the system of economic measures, creates the appearance of the economic disadvantage of the implementation for the country of several highly efficient economic measures, and in some situations encourages the wasting of assets on the development and production of products of a low technical level and quality.

The noted peculiarities of prevailing prices dictate the need for the use in case of the economic substantiation of large-scale economic measures, the implementation of which has an influence on the change of the formed proportions of the national economy, of so-called accounting prices (the inclusive expenditures on products of the sectors, which use nature, the upper limit of the price of new equipment and others). For the same reason it would be incorrect to use the prevailing prices in order to evaluate by means of them the economic results of the implementation of long-term programs of the socioeconomic development of the country. It must be kept in mind that some measures, even ones which are quickly implemented, influence the socioeconomic situation of the country for many years. Therefore the accomplishment of the tasks of long-range development by means of prevailing prices is equivalent to maintaining in the future some adverse trends which occurred in the past.

Apparently, it would also be incorrect to use prevailing prices for the evaluation of the efficiency of the development of foreign economic relations, where it is necessary to compare the expenditures and results by enlisting so-called world prices. When evaluating the efficiency of the production resources, which are used for the implementation of social programs, it is also necessary to resort to accounting prices, which reflect more thoroughly and accurately the real consumption and efficiency of material wealth.

Thus, the diversity of the problems, which are being solved in planning and design and economic practice, requires the use of prevailing and accounting prices. The former serve the sphere of the current economic turnover, provide the cost accounting conditions of the functioning of economic objects and are used for the evaluation of the cost accounting efficiency of production, the

economic soundness of measures, which are being implemented within a separate enterprise or association and are carried out, as a rule, by means of internal sources of financing and so on.

Planned accounting prices are designed for the evaluation and selection of the best version of a large-scale economic measure.

In our opinion, with time the essential convergence of the two systems of the economic measurement of the results of production should occur. The methodology of determining the planned accounting prices should be, apparently, the underlying base for this. And this is not by chance, since it is based on the following most important principles:

the approximation by prices of the level of the socially necessary expenditures by means of the more complete reflection in them of the standard efficiency of the production resources and natural resources, which are being used (this finds reflection in the calculations of the national economic production cost, the basis for which are the forthcoming expenditures on the reproduction of a unit of the product with allowance made for scientific and technical progress and the anticipated changes of the natural conditions of production, environmental protection and social standards);

the measurement of the effective impact and the shortage of new equipment (in terms of the so-called upper limit of the price, which takes into account the degree of economy of a new product, as well as the systematic balance of its production and use).

Planned accounting prices are used, if:

a) the prevailing retail prices and rates for services to the population do not compensate for the production costs or are less than the corresponding wholesale and purchase prices. In this case the economic evaluation is obtained by the adjustment of the prevailing retail prices and rates so that they would exceed the established production costs, as well as the level of the wholesale and purchase prices by the amount of the trade discount (markup);

b) the prevailing prices for the used types of raw materials and fuel are greater than the inclusive prices for the products of the sectors which use nature. The inclusive expenditures characterize the maximum permissible level for a certain period of the specific expenditures on the increase of the production of the given type of product by the extractive sectors and agriculture and are established by the organs which draft and approve the plan. Here the economic evaluation of the corresponding resource is used at the level of the inclusive expenditures;

c) the prevailing prices for export commodities are less than the world prices. In this case the economic evaluation of the result is established at the level of the world price;

d) the prevailing prices for a new product for production engineering purposes do not take fully into account its consumer properties and economic

impact in consumption. Then the economic evaluation of the result is determined on the basis of the calculation of the so-called upper limit of the price, which is equal to the sum of the adjusted expenditures on the production of new equipment and the economic impact for the national economy from its use. When calculating the latter the peculiarities of the operation of new equipment in individual spheres of consumption, as well as the possibilities and planned sequence of the meeting of the needs for this equipment by various consumers are taken into account. In this situation the economic evaluation appears at the same time as the standard of the systematic balance of the supply and demand of the new equipment.

3. The Integral Economic Impact for the National Economy Is a Generalizing Economic Measurer of New Equipment

The indicator of the economic impact for the national economy is a most important indicator of the efficiency of the use of new equipment. Two interconnected aspects of efficiency--the economic evaluation of the expenditures of resources and of the results of production--find reflection in it. The economic impact shows by how much the result of the use of new equipment exceeds the expenditures connected with its development. Inasmuch as both the expenditures and the results are calculated by means of a common set of economic standards, the impact reflects the above-standard saving of production resources. If the results are equal to the expenditures, the national economy does not derive above-standard income. This means that the new equipment yields per ruble of expenditures exactly the same impact as any other measure envisaged in the plan. From this standpoint it is also impossible to regard such equipment as new, while the entire impact, which is equal in this case to the standard income, should be transferred to the budget. That is why the planning and stimulation of new equipment were always organized in accordance with the above-standard impact, which received the name of the economic impact for the national economy.

It is also clear how important it is in case of the planning and economic stimulation of the development and use of new equipment to ensure procedural unity in the calculations of the national economic impact. In case of its determination it is possible to speak [6]:

first, about the impact $Э^{г}$, which is obtained during each individual year of the production (use) of the new equipment--the annual economic impact;

second, about the economic impact $Э^{т}$, which is obtained from the annual output of new equipment of long-term use, yet not for 1 year of its operation, but for the entire period of service, that is, it is a question of the total economic impact, but from the annual volume of output of the new equipment;

third, about the economic impact $Э^{t}$, which is obtained from the annual volume of output of the new equipment during each individual year over its entire service life.

Let us explain the difference between the indicated types of impact on the basis of the following example. Let the new equipment be produced in the amount of 1,200 units a year and serve 10 years, while the economic impact

from the use of a unit of the new equipment during the year be equal to 1,000 rubles. Then $Э^{г}$=1200 X 1000=1.2 million rubles; $Э^{т}$=1200 X 1000 X 10= 12 million rubles; $Э^{t}$ in this example coincides with $Э^{г}$.

The examined impacts are versions of the generalizing indicator of efficiency--the integral economic impact for the national economy--$Э_{\Sigma}$. It can be expressed by the sum of either the total impacts, which is determined for the entire planned period of the production of the new equipment, or the impacts for the entire time of its use. Let us illustrate this by the following example.

Let the new equipment have the service life T=5 years and be produced for 4 years; the volumes of output by years are respectively A_1=100 units; A_2=500 units; A_3=300 units and A_4=1,000 units. The annual impact from the use of a unit of the new equipment depends on the years of its output. During the first year in connection with the small scale of production the new equipment is unprofitable (-40 rubles per unit). But for the second year it already yields an impact in the amount of 50 rubles per unit, for the third year--120 rubles and the fourth year--200 rubles. During the entire time of production 12,000 units of new equipment were produced.

The integral national economic impact can be calculated by years of either the output or the use of the new equipment. In the former case it will be equal to 1,585,000 rubles (-20+125+480+1000), in the latter--1,585,000 rubles (-4+21+117+317+317+321+296+200). The results of the calculations turned out to be identical. However, the first method of determining the integral impact is less labor-consuming, especially when the value of the annual impact for all years of the service of the new equipment remains constant.

But there is another group of problems (for example, the evaluation of the aggregate impact from the introduction of new equipment for the national economy as a whole, the ministry, the association and so on), in which it is necessary to calculate directly the integral amount for 1 year taken separately. In this case it is inadvisable to switch to the calculation of the total impacts, since different types of new equipment have different service lives, starts and durations of production and so on.

It is impossible to recognize the stated procedure of determining the integral economic impact as sufficiently thorough, since it proceeds from the assumption that all the preproduction expenditures, which are connected with the development of the design, the production of the prototype and the preparation of production, are covered by means of special centralized sources, for example, the fund for the development of science and technology. The use of such sources is also designed so as "not to burden" the first models of new equipment with great expenditures and not to throw them onto the shoulders of the consumer. This creates the proper conditions for the cost accounting stimulation of its production and consumption. It is a different matter when it is a question of choosing its best version. Here it must be known in addition how much its production will cost with respect to labor expenditures, what economic gain the consumer will derive and what the economic gain of the national economy from the use of the entire amount of new equipment is. For this it is important to take into account the full amount on the one-time expenditures regardless of the source of their financing.

In our example they came during the base year to 200,000 rubles, during the first year of the preparation of production--280,000 rubles and for the second year--already 420,000 rubles; the total for 3 years is 900,000 rubles. In essence, it is possible to regard their amount as a negative economic impact, that is, only expenditures, while during this period of time, of course, there is no effective yield. But they must not be considered useless: they are socially necessary, since new equipment, which is characterized by higher consumer properties and quality, cannot be developed at all without them. It is another matter that the need for these expenditures can be estimated in the process of using the new equipment itself, when only its operating advantages can be identified. That is why it is necessary each to to compare the additional expenditures in case of its production with the saving of labor in the sphere of use. For this the integral value of the economic impact for the national economy, which is calculated with the deduction of the additional expenditures on the preparation of production, is also determined. Its positive value serves as the basis for the recognition of the version in question of the new equipment as economically sound.

Since the amount of the preproduction expenditures is assigned to the total amount of new equipment which enters the national economic turnover, it should be compared with the integral impact from its total output over the entire period of production. In our example the integral impact, which is calculated with allowance made for the preproduction expenditures, will come to 685,000 rubles (1585-900=685), which attests to its quite great efficiency.

The calculation of the integral impact by individual years of the planning period is of definite interest for the planning and economic stimulation of new equipment. Thus, during the first year of the output of new equipment the total losses for the national economy are equal to 920,000 rubles ((-20)+(-900)). For the second year they decreased to 795,000 rubles ((125)+(-920)), and for the third year--to 315,000 rubles ((480)+(-795)). And only for the fourth (in our example the last) year of the production of new equipment does the impact become positive. Its amount, as we already saw earlier, is equal to 685,000 rubles ((1000)+(-315)). Thus, the integral impact from the total output of new equipment, in essence, is the cumulative impact, which is realized in the last year of its output. This is an important circumstance, which shows why the orientation toward the annual impact, as occurs in all the now prevailing methods and instructions on new equipment, is inadequately sound. The very idea of calculating the annual economic impact was borrowed from the practice of current (annual) planning, which, in our opinion, is at variance with the very logic of the long-term nature of the development and implementation of new equipment. Therefore in [9] there was taken as the generalizing indicator of its efficiency the indicator which is determined for its entire service life (see formula 4 in [9]).

Of course, this does not mean that we should direct our attention here, there and everywhere to the total economic impact from the annual output of new equipment. This amount takes into account only one aspect of the dynamics of its efficiency. Another, no less important aspect, which reflects the change of efficiency from the enlargement of the scale of the introduction of new equipment in the national economy, remains as if with personnel. The

simultaneous influence of the two indicated factors finds its expression in the integral economic impact for the national economy.

What has been said should not be understood to mean that the time has come to reject in the calculations of efficiency the indicator of the annual economic impact. Its amount is the initial amount for the calculation of the total and integral impacts, but it is also of independent importance, being, as we have already noted, an indispensable attribute of the planning of new equipment. The financial, material and other types of resources, which are allocated to scientific research and design organizations, associations and enterprises for a specific year of its preparation, assimilation and series production, should be determined on its basis. The annual impact should also be taken into account when establishing the amount of the deductions for the budget from the revenues of associations and enterprises as a result of the introduction of new equipment.

The indicator of the annual economic impact can also be used as a criterional indicator when choosing the best version of new equipment. But this is legitimate only for a special case of comparison, when the expenditures and results of production and, consequently, the amount of the annual impact over the entire accounting period remain unchanged.

I would like in this connection to make another remark, which concerns the procedure of paying bonuses for the development and introduction of new equipment [6]. As is known, at present the amount of such bonuses is set subject to the amount of the annual economic impact. It seems that when determining them it is advisable to take into account not only the annual saving from use, but also the time, during which this saving will occur, that is, to take into account the service life of the new equipment, the volumes and period of its output. This will make it possible to strengthen the orientation of developers toward the development of such models which yield the maximum integral national economic impact, as well as to measure the amount of the bonuses if necessary.

4. The Interconnection of the System of Economic Measurements With the Economic Mechanism of Management

The problem of an interconnection is a key and, in our opinion, most significant one in the settlement of the entire set of questions which are connected with the improvement of the management of scientific and technical progress. And this is not by chance. We have already noted that a certain contradiction exists between the economic indicators which are used today in planning and design practice, in case of the substantiation of versions of new equipment and in economic calculations at associations and enterprises.

From a cost accounting standpoint the increase of efficiency is connected with the increase of labor productivity, with the better use of raw material and material resources, fixed capital, production capacities and so on, that is, with the increase of the level of every indicator which reflects one aspect or another of production efficiency. Of course, it is good when in production at the same time labor productivity increases, the materials-output ratio and production cost decrease, the output-capital ratio increases and the quality

of the output being produces improves. In this case the economic efficiency, which is estimated from the standpoint of the cost accounting unit, will coincide with the estimate, on the basis of the interests of the national economy as a whole. But usually it happens as follows: the saving in the consumption of one resource is accompanied by the excessive consumption of another; labor productivity increases, but the output-capital ratio decreases; product quality worsens, but the profit of the enterprise increases and so on. It might turn out, for example, that under the conditions of one works the decrease of material expenditures by only 1 percent exceeds the overspending in the remuneration of labor by 10-12 percent, while at another enterprise the increase of productivity by 10 percent exceeds the decrease of the output-capital ratio by 5 percent and so on. As a result the situation, when not the version, which increases somewhat all the indicators simultaneously, but a completely different one, which allows a certain worsening of some, but by means of the substantial improvement of others, will be preferable from the standpoint of the overall efficiency, is not ruled out. But even if one strives to achieve the increase of all the indicators at once, which, of course, must only be welcomed, in this case it remains unclear by how much labor productivity and the output-capital ratio should be increased, the materials-output and product cost should be decreased in order to obtain the maximum economic gain.

Individual, though even very important, indicators, which are used today for the evaluation of the economic efficiency of the use of economic resources, are not capable of reflecting the changes of the overall production efficiency. Moreover, the increase of efficiency, which is measured by means of indicators of this sort in the individually taken unit, does not at all mean that here it will increase for social production as a whole. It might turn out, for example, that the gain, which is obtained at one enterprise, in a separate sector, does not compensate for the economic losses which arise in this case at other enterprises and sectors of the national economy.

The approach used in the sphere of technical and economic substantiations links the increase of efficiency with the increase of the generalizing indicator--the economic impact for the national economy. All the other partial indicators of efficiency: productivity, the output-capital ratio and the materials-output ratio, are synthesized in it. The corresponding weighting factors, the role of which is performed by the planning standards of the efficiency of the use of production resources, are used for this. And owing to this the emulation of the increase of the generalizing indicator of efficiency, in essence, signifies an orientation toward a common national economic level of the efficiency of the consumption of economic resources, which ensure the optimum proportions in the development of the national economic in conformity with the socioeconomic goals which have been set in the plan.

It is clear that between the two systems of economic measurements (the cost accounting system and the system used in planning and design practice) there exist differences which run in many directions:

from the point of view of the basic principle of the evaluation of efficiency: in the former system it originates from the achieved level of the increase of

the volume indicators of production; in the latter--from the standpoint of the exceeding of the level of the efficiency of the use of production resources, which is established in the plan;

on the basis of the criteria of evaluation: in the former system this is the increase of each of the established indicators of the plan; in the latter--the increase of the economic impact for the national economy under the conditions of the limitations adopted in the plan;

depending on the results of production: in the former system they are measured by means of prices which reflect the average and, in some cases, the individual current production costs, which, as a rule, do not take into account the "burden" of capital investments and other types of limitations of resources and take far from completely into account the utility of the product for the consumer; in the latter system the results of production are usually calculated in prices which take into account the national economic efficiency of the resources being used and the product itself;

from the point of view of the expenditures on production: in the former system they are evaluated by the production cost, which is determined, as a rule, on the basis of individual standards of the consumption of raw materials and materials and the expenditures of labor, while in the latter--by the adjusted expenditures, which are formed by means of the standards of the efficiency of the use of the corresponding critical resources;

according to the time factor: in the former system it is practically not taken into account, while in the latter it acts as the basis for the calculation of the indicators of the expenditures and the results of production and the indicator of the economic impact for the national economy, which is determined on their basis;

from the standpoint of the factor of uncertainty: in the former system it actually remains outside the field of view, while in the latter it is finding greater and greater use;

on the basis of the variance of the economic measures and the economic substantiation of the decision which was made in the plan: in the former system, in essence, it is absent, but if it is implemented, it is far from fully, in the latter it occurs and is realized with the enlistment of national economic criteria of economic efficiency.

The "peaceful coexistence" of the two systems of economic measurements is dictated by the fact the the former of them is the basic one, while the latter acts as the auxiliary one, which serves the comparatively narrow sphere of technical and economic substantiations of plans of capital construction, new equipment and other local measures. In this connection the proper attention is not being directed to it on the part of economic managers. Moreover, since today there are no criteria of comparative efficiency in cost accounting, the misconception about the conditional nature of the calculations of economic efficiency, which ostensibly do not have a direct bearing on real economic practice, has formed among some economists and planning workers.

The inadequate theoretical working up of the latter system for practical implementation is another, no less important reason. Many methodological and procedural questions require further coordinated research: the set of criteria of efficiency, which serves different levels of management and is used when solving a specific class of problems; the specific methods of the calculation and differentiation of economic standards with allowance made for social, territorial production and other factors, which are connected first of all with scientific and technical progress, and so on.

In spite of the outwardly apparent independence of the two systems of economic measurements, contradictions, which periodically cause changes in the methods of management, arise between them. It is most significant that primarily the basic cost accounting system of economic measurements is susceptible to these changes. Two or three times in the past 15-20 years the evaluation indicators of the work of enterprises have changed, new indicators of economic stimulation have been introduced, the approach to the establishment of the prices for new products has been revised and so on. Such categories as the fee for productive capital, rent payments, the economic impact of scientific and technical developments, markups and reductions on the prices for products of different quality and so forth have been included in economic usage. The methodology of measuring the comparative efficiency is also having a greater and greater influence on the formation of the views of production managers in case of their settlement of purely economic questions. All this underscores the objective nature of the system of measurements, which is used in the sphere of technical and economic substantiations. It, apparently, can be regarded as the basis of economic measurements in the economic mechanism of production management under the conditions of mature socialism.

The reform of the economic mechanism in the direction of the intensification and the increase of the efficiency of production, in our opinion, cannot be accomplished as a one-time act. It affects the deep strata of this mechanism, the methods of management on the basis of long-term economic standards, economic evaluations of the results of production, the unified criteria of the evaluation of the efficiency and the stimulation of production, the interconnected system of the financial and resource support of the plan, the distribution of revenues and so on. Exhaustive scientific research is necessary in order to implement such an approach. Obviously, much stage-by-stage work lies ahead.

The inclusion of the methods of the economic substantiations of new equipment in the general technique of drafting the national economic plan is the first and initial stage in the implementation of unified principles of economic measurements. They should, in our opinion, serve the stage of the preliminary selection of the best versions of the planning decisions. This will make it possible to avoid many mistakes when implementing the plan.

It is advisable to implement the unified principles of economic measurements in the system of planning and economic management by various methods. Here the specific versions of the tools of management, as well as the values of the corresponding economic standards should be coordinated with each other so that the results of their joint influence on the functioning of objects and on the evaluation of the efficiency of measures would meet the requirement of the

maximization of the end national economic results. Thus, in our opinion, the standard of the fee for productive capital should coincide with the standard of the adjustment of the one-time expenditures and results and, of course, with the norm of the effectiveness of capital investments and with the interest on long-term bank credit, if the initial value of the capital serves as the basis for its calculation, while the total amount of the amortization deductions for renovation, which are determined with allowance made for the time factor, are left at the disposal of the organization which is using the capital.

The agreement of the corresponding standards does not necessarily signify their equality, but requires the evaluation of the influence of those factors which govern their difference under some conditions or others of the functioning of the economy.

The elaboration of a set of measures of economic responsibility for the achievement of the rated value of the economic impact with the imposition of the corresponding sanctions on the specific parties guilty for its overstatement or deficiency as a result of the inefficient use of new equipment would be an important feature in the implementation of the principles of the unified system of economic measurements.

The draft of the Comprehensive Method of Evaluating the Effectiveness of Economic Measures [10, 11] is also aimed at the extensive implementation of the unified system of economic measurements in the management of scientific and technical progress.

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CSO: 1814/54

FACILITIES AND MANPOWER

CONTRIBUTION OF STATE PRIZE WINNERS TO PRODUCTION INTENSIFICATION

Moscow IZVESTIYA in Russian 9 Nov 84 p 2

[Article by Corresponding Member of the USSR Academy of Sciences V. Yelyutin, deputy chairman of the Committee for Lenin and USSR State Prizes in Science and Technology: "To the Heights of Science and Technology"]

[Text] The achievements of knowledge, which have been embodied in advanced equipment and technology, in our times are becoming the main source of the intensification of production. They are having an increasing influence on the development of social relations and culture and on the way of life of the Soviet people. The works, which were awarded the 1984 USSR State Prizes in Science and Technology, serve as new evidence of this.

The leading field of the natural sciences, physics, is represented by four cycles of basic research. As a result of the work, which was devoted to magnetism and the electron structure of rare earth metals and uranium compounds, the foundation was laid for the development of a new direction in magnetic materials technology, the scientific principles of the development of highly efficient magnetic materials for various purposes with preset properties were developed.

A large contribution to mathematical physics was made by the authors of a new method of modern quantum field theory, which made it possible to enrich significantly the natural science picture of the world: to predict the properties of quarks at small distances, to substantiate the possibility of combining strong (nuclear), weak and electromagnetic interactions and to pose the problem of the stability of matter.

The prize was awarded to the founders of a new class of powerful coherent radiation, which is tunable by frequency in the ultraviolet, visible and infrared ranges--precisely this property became decisive in the more and more extensive use of lasers in scientific research and economic practice. Another work of physics scholars was crowned with the obtaining and industrial production of new semiconductor materials for electroluminescent and photoelectric instruments in a broad spectral range.

The creative activity of Academician I. N. Vekua left a vivid mark in the development of applied mathematics. The monograph "Nekotoryye obshchiye

metody postroyeniya razlichnykh variantov teorii obolochek" [Several General Methods of Constructing Different Versions of Shell Theory], which was awarded the State Prize, is among his final works. Another work in the field of the mathematical sciences, which enriched the present methods of analysis of complex nonlinear systems, is also no less topical.

The work of the prize winners in the area of the production of plastics personifies the front line of the development of chemical technology. The equipment developed by them, the found technological solutions and the extensive use of the achievements of robotics made it possible to realize highly automated waste-free production of a new type.

The work on the discovery and rapid preparation for commercial development of the Yamburgskiy gas condensate deposit was also commended by the lofty award.

The achievements of biological science are now making it possible to shift to a greater and greater extent from the study of the living organism to the regulation of biological processes. The elaboration of the fundamental principles of cellular engineering, which opened the way to the industrial cultivation of plants with preset biological properties, belongs to this new level of knowledge. The works in the area of biological catalysis, which were awarded the State Prize, are also of a priority nature.

The June (1983) CPSU Central Committee Plenum deemed it necessary to focus the scientific research of social scientists on truly cardinal problems. The monograph of A. A. Gromyko "Vneshnyaya ekspansiya kapitala: istoriya i sovremennost'" [The Foreign Expansion of Capital: History and the Present] should first of all be grouped with such research. The monograph of V. V. Sedov "Vostochnyye slavyane v VI-XIII vekakh" [The Eastern Slavs in the 6th-13th Centuries] and a series of works on the problems of criminological science were also commended with the prize.

The achievements of plant growers are represented by a new technology of the production of high quality seeds of coniferous species of trees. This technology ensures the preservation and increase of value timber resources, yielding annually an economic impact of 4 million rubles.

Clear confirmation of the viability of the ideas of the October (1984) CPSU Central Committee Plenum is the organization of a zone of highly efficient agricultural production on the basis of the Great Stavropol Canal. The technology of the waste-free production of new forms of food products with an increased content of protein, vitamins and mineral salts is contributing to the more complete meeting of the needs for high quality food products and to the enlargement of their assortment.

The basic trends of the development of Soviet medicine with its preferential attention to the prevention and early detection of diseases, their study and treatment from the standpoint of the vital activity of the whole human body distinguish the monograph of A. D. Ado "Obshchaya allergologiya" [General Allergology]. A set of compounds, which make it possible to decrease drastically the threat to life and health from staphylococcic infection, has found extensive use in practical health care. The Baks cardiological

biological protheses personify the union of medicine and technology: they are capable of effectively restoring the operation of the normal aortic valve and in their functional characteristics are two- to threefold superior than the best world models.

Rapid scientific and technical progress in machine building is a decisive prerequisite of the intensification of the entire national economy. The development of the technology of cold longitudinal ring rolling and equipment for the mass production of cylindrical items, first of all torsion bars and motor vehicle and tractor axles, was an important achievement in this direction. A problem of great national economic importance--the assurance of the conveyorless working of coal deposits in the eastern regions of the country--has been solved owing to the extensive use of walking dragline excavators, the economic impact from the introduction of which is estimated at 30 million rubles. Heavy-duty and single-design power presses for the production of stamped items are being used not only in the USSR, but also in 40 countries of the world. The prize winners formulated the theory of the designing and analysis of these presses and ensured the development and introduction of automatic lines and complexes.

The gas supply system, which was implemented at the Norilsk Mining and Metallurgical Combine imeni A. P. Zavenyagin, does not have world analogues. Fundamentally new designs were the basis for it.

The introduction of the scientific methods of high-speed flow line construction played a decisive role in the early placement into operation of the Urengoy-Pomary-Uzhgorod transcontinental gas pipeline. Their use ensured an unprecedented pace of construction of the gas pipeline. The Trans-Alaskan Pipeline in the United States, which is similar in scale, took seven times longer to build with more significant labor expenditures.

Means of automation, especially those which are used in systems of organizational control, are becoming a source of qualitative changes in the national economy. The work of the State Prize winners, which is realized in 170 projects, is serving the further broadening of their use.

The development and introduction in the national economy of multiregion photographic equipment have significantly enriched the possibilities of studying the natural resources of earth from space. And another achievement of the instrument makers is the base design and the unified system of software of X-ray holographs, which are intended for the study of the brain and the diagnosis of its disorders.

The set of data on the thermodynamic properties of individual substances and products of combustion found extensive use in the designing of engines, processes and apparatus of the chemical industry. The determination of the thickness of sea and fresh-water ice is of cardinal importance for navigation in the Arctic, Antarctica and the basins of northern rivers. The solution of this problem was obtained on the basis of the method of the synthesized video pulse signal, which was realized in the Led device and the Akvamarin industrial ice thickness gauge. In the area of radio electronics the development of high-vacuum magnetic discharge pumps was also commended by the

prize--the economic impact from their use has already amounted to 310 million rubles.

The main advantage of modeling by the method of equivalent materials is the possibility of substantiating by laboratory means the plan of the most efficient and safe performance of mining operations and underground construction.

During 1965-1982 the volume of coal production was increased by 2.5-fold by the Kemerovo Coal Association. Such an increase of production became possible owing to the strip mining of coking coals, which was implemented by the prize winners.

An original method of the hot repair of the lining--the heat-proof facing of converters--has been introduced at the majority of electrometallurgical plants of the country. The new method ensures the shortening of the repair time to 5-7 minutes with the increase of the operating life of the lining on the average by 280 smeltings. The new technology and set of equipment for the smelting of pig iron ensure the replacement of up to 20-30 percent of the scarce coke with pulverized coal made from prevalent noncoking coals.

Another work of metallurgists, which is connected with the development of the technology of processing a new type of crude iron ore--phosphorites of brown limestones--also serves the broadening of the material and raw material base of the USSR. This technology, which has been implemented at the Karaganda Metallurgical Combines, is making it possible to commit to use a number of very large deposits.

In the outstanding labor triumph of our day--the placement into operation of the Baykal-Amur Railway Line--the contribution of bridge builders, who erected about 3,000 bridges, is great. A fundamentally new design solution--completely prefabricated bridges on columnar piers--helped to perform such an amount of work in the shortest possible time. The developers of the theory of the corrosion of the most prevalent construction material of the present--reinforced concrete--on the basis of which permanent components are designed, also became prize winners.

State Prizes were awarded to a number of textbooks for higher educational institutions, secondary specialized educational institutions and general educational schools.

In order to ensure the further increase and efficient use of the scientific and technical potential of our society, "the creative nature of labor and a creative approach to one's job," General Secretary of the CPSU Central Committee and Chairman of the Presidium of the USSR Supreme Soviet Comrade K. U. Chernenko indicates, "should today be a distinctive trait of every intellectual--the scientist or engineer, teacher or physician. As, of course, of every worker, every kolkhoz farmer...." And the creative achievements of the State Prize winners serve as good guidelines in this.

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CSO: 1814/62

FACILITIES AND MANPOWER

ELECTION OF NEW MEMBERS OF USSR ACADEMY OF SCIENCES

Moscow IZVESTIYA in Russian 29 Dec 84 p 3

[Article by President of the USSR Academy of Sciences Academician A. P. Aleksandrov and Chief Scientific Secretary of the Presidium of the USSR Academy of Sciences Academician G. K. Skryabin: "From the USSR Academy of Sciences"]

[Text] In conformity with the announcement of the USSR Academy of Sciences of 13 (14) September 1984 on the holding of the election of members of the USSR Academy of Sciences 202 candidates for full members of the USSR Academy of Sciences and 1,070 candidates for corresponding members of the USSR Academy of Sciences were nominated by full members and corresponding members of the academies of sciences, the councils of scientific institutions and higher educational institutions and state and public organizations and were registered.

In accordance with its charter on 25 December 1984 the General Assembly of the USSR Academy of Sciences elected the following scientists as full members of the USSR Academy of Sciences and corresponding members of the USSR Academy of Sciences:

Full Members of the USSR Academy of Sciences

The Mathematics Department

Gel'fand, I. M.
Maslov, V. P.
Mitropol'skiy, Yu. A.
Mishchenko, Ye. F.

The General Physics and Astronomy Department

Aleksandrov, K. S.
Bogomolov, A. F.
Kagan, Yu. M.
Mesyats, G. A.
Khalatnikov, I. M.
Kharadze, Ye. K.

The Nuclear Physics Department

Barkov, L. M.

The Physical Technical Problems of Power Engineering Department

Demirchyan, K. S.

The Mechanics and Control Processes Department

Novozhilov, G. V.
Raushenbakh, B. V.
Reshetnev, M. F.
Solomenko, N. S.
Tupolev, A. A.
Utkin, V. F.
Fedosov, Ye. A.
Frolov, K. V.

The Information Science, Computer Technology and Automation Department

Alekseyev, A. S.
Valiyev, K. A.
Gulyayev, Yu. V.
Yemel'yanov, S. V.
Yershov, A. P.
Koshkin, L. N.
Mikhalevich, V. S.
Moiseyev, N. N.
Naumov, B. N.
Pozhela, Yu. K.
Pospelov, G. S.
Rzhanov, A. V.
Savin, A. I.
Sheremet'yevskiy, N. N.

The Physical Chemistry and Technology of Inorganic Materials Department

Buslayev, Yu. A.
Gorynin, I. V.
Fridlyander, I. N.

The Biochemistry, Biophysics and Chemistry of Physiologically Active Compounds Department

Petrov, R. V.

The Physiology Department

Govyrin, V. A.
Ugolev, A. M.

The General Biology Department

Isayev, A. S.

The Geology, Geophysics and Geochemistry Department

Logachev, N. A.
Puzyrev, N. N.
Pushcharovskiy, Yu. M.
Shemyakin, Ye. I.

The Oceanology, Atmospheric Physics and Geography Department

Avsyuk, G. A.
Kondrat'yev, K. Ya.

The History Department

Vinogradov, V. A.

The Philosophy and Law Department

Kudryavtsev, V. N.

The Economics Department

Anchishkin, A. I.
Lukinov, I. I.
Nikonov, A. A.

The Literature and Language Department

Gamkrelidze, T. V.
Markov, D. F.
Serebrennikov, B. A.

Corresponding Members of the USSR Academy of Sciences

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Arnol'd, V. I.
Bogolyubov, N. N.
Kudryavtsev, L. D.
Mikhaylov, G. A.
Pokhozhayev, S. I.
Sevast'yanov, B. A.

The General Physics and Astronomy Department

Bonch-Bruyevich, A. M.
Galanin, M. D.

Golant, V. Ye.
Gurevich, A. V.
Didenko, A. N.
Zakharov, V. Ye.
Karlov, N. V.
Kovtunenko, V. M.
Pis'mennyy, V. D.
Syunyayev, R. A.
Chirikov, B. V.

The Nuclear Physics Department

Gershteyn, S. S.
Mostovoy, V. I.
Nikol'skiy, S. I.
Polyakov, A. M.
Tavkhelidze, A. N.

The Physical Technical Problems of Power Engineering Department

Alemasov, V. Ye.
Kiryukhin, V. I.
Kulakov, A. V.
Makarov, A. A.
Ponomarev-Stepnoy, N. N.
Khabibullayev, P. K.

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Anfimov, N. A.
Belyanin, P. N.
Vasil'yev, V. V.
Yeger, S. M.
Nepobedimyy, S. P.
Osipov, Yu. S.
Semikhatov, N. A.
Spasskiy, I. D.

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Agadzhanov, P. A.
Afanas'yev, A. M.
Babayan, B. A.
Basistov, A. G.
Gribov, B. G.
Gus'kov, G. Ya.
Yefremov, V. P.
Zhuravlev, Yu. I.
Ivannikov, V. P.
Kalyayev, A. V.
Kozlov, D. I.

Kolesnikov, V. G.
Krasnoshchekov, P. S.
Kuznetsov, F. A.
Kurdyumov, S. P.
Mizin, I. A.
Mikaelyan, A. L.
Miroshnikov, M. M.
Parkhomenko, P. P.
Presnukhin, L. N.
Ryabov, G. G.
Stogniy, A. A.
Sumarokov, L. N.
Shipunov, A. G.
Shokin, Yu. I.

The General and Technical Chemistry Department

Tsvetkov, Yu. D.

The Physical Chemistry and Technology of Inorganic Materials Department

Krasnoshchekov, Yu. I.
Purin, B. A.
Rusanov, V. D.
Tret'yakov, Yu. D.

The Biochemistry, Biophysics and Chemistry of Physiologically Active Compounds Department

Bogdanov, A. A.
Dobrovol'skiy, G. V.
Privalov, P. L.
Salyayev, R. K.
Sverdlov, Ye. D.

The Physiology Department

Vasil'yev, N. N.
Fanardzhyan, V. V.
Chaylakhyan, L. M.

The General Biology Department

Andreyev, L. N.
Shilov, I. A.
Yablokov, A. V.

The Geology, Geophysics and Geochemistry Department

Abasov, M. T.
Dobretsov, N. L.
Karus, Ye. V.

Koval'skiy, V. V.
Krendelev, F. P.
Rundkvist, D. V.
Rykunov, L. N.
Ryabchikov, I. D.

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Vinogradov, M. Ye.
Zalikhanov, M. Ch.
Khublaryan, M. G.

The History Department

Novosel'tsev, A. P.
Pisarev, Yu. A.

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Mshveniyeradze, V. V.
Starushenko, G. B.

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Abalkin, L. I.
Vol'skiy, V. V.
Granberg, A. G.
Zhurkin, V. V.
Medvedev, V. A.
Petrakov, N. Ya.
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Yakovlev, A. N.

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Balashov, N. I.
Gamzatov, G. G.
Dmitriyev, L. A.
Nikolayev, P. A.
Novikov, V. V.
Solntsev, V. M.
Stepanov, Yu. S.
Tenishev, E. R.
Tolstoy, N. I.
Shvedova, N. Yu.
Shmelev, D. N.

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CSO: 1814/62

AUTOMATION AND INFORMATION POLICY

UNITED INTERSECTORIAL INFORMATION CENTER URGED

Moscow SOVETSKAYA ROSSIYA in Russian 12 Dec 84 p 2

[Article: "The Data Bank"]

[Text] In the interview "The Idea by Installments," which was published on 12 July 1984, Academician P. I. Mel'nikov posed specific questions about the existing practice of introduction. The official responses received by the editorial office confirm their urgency. It was difficult to count on a unanimous opinion of specialists--the problem is complex and many-sided. But the majority of organizations and departments agree on the main thing, that today it is necessary to make the most rational decision. Moreover, means to such a decision are outlined.

Thus, Vice President of the USSR Academy of Sciences Academician A. L. Yanshin reports: "The USSR Academy of Sciences wholly supports the statement of Academician P. I. Mel'nikov about the need for the establishment of a highly efficient intersectorial information center on the basic directions of scientific and technical progress and is prepared to provide the necessary scientific methods assistance in this matter. The practical solution of this problem is in the competence of the USSR State Committee for Science and Technology, the ministries and departments, on which the material, technical and personnel support of the organization of the indicated center depends."

A. I. Chubarenko, a member of the Collegium of the USSR State Planning Committee, considers the critical remarks presented in the publication to be correct. Taking into account that the technical and organizational level of construction still does not completely satisfy present requirements, the State Planning Committee has outlined a number of measures which ensure the acceleration of the introduction in practice of the achievements of science and technology and advanced know-how.

Specific steps have also been taken by the USSR State Committee for Construction Affairs: a network of scientific coordinating councils for the most important problems of construction has been developed, introduction services, the task of which is the provision of practical assistance to construction projects and enterprises, have been set up at all the institutes of the State Committee for Construction Affairs. Deputy Chairman of the USSR State Committee for Construction Affairs I. I. Ishchenko also reported that

for the acceleration of the introduction of the latest achievements of science and technology the State Committee for Construction Affairs has given permission to use in the plans for construction the results of scientific research operations up to their inclusion in standard documents.

Thus, several of the questions raised in the publication of SOVETSKAYA ROSSIYA have been planned for realization. Several, but not all. And therefore the response of N. B. Arutyunov, chief of the Scientific and Technical Information and Propaganda Administration of the USSR State Committee for Science and Technology, which runs counter to the other letters, in which the formed situation is analyzed and the steps being taken are spoken about, arouses astonishment. Comrade Arutyunov, without supporting and without refuting the assumptions of the published material, basically reports merely that the organs of scientific and technical information of the country serve any consumer, regardless of his departmental affiliation.

But where then, one would like to know, are the information gaps from? Why do different organizations invent their own "bicycles," starting their development from nothing, instead of using ideas, which were advanced long ago, and plans, which are ready for introduction?

In the editorial conclusion to the interview of Academician P. I. Mel'nikov the newspaper asked that opinions be expressed on the posed problems, hoping that this would aid their solution. The participants in the recently held Collegium of the State Committee for Sciences and Technology, which examined the work of intersectorial territorial centers of scientific and technical information and propaganda, also spoke about the fact that the need for this is ripe. They noted that this work needs serious improvement, and made suggestions on its improvement. The readers of the newspaper are also proposing their own measures.

The following suggestion is being formed on the basis of the analysis of the letters received by the editorial office. Perhaps, it makes sense to think about how to unite the numerous and insufficiently efficient information centers and institutes into a single powerful organization with departments locally. The efficiency of the use of equipment--data processing, microfilming, duplicating equipment and so on--would increase sharply at such a center. Any scientist, engineer or manager could address the unique information service without special training, knowing that in the shortest possible time he will receive the required information on all sections of science and technology.

The united center could coordinate research: not only suggest to authors all the required information on the theme and report on the work being performed in this direction, but also halt secondary work, which duplicates some previous, nonurgent work. That is, assume the functions of an unbiased extradepartmental and, thus, most objective inspectorate, which is guided exclusively by the interests of science and technology.

Such unification, to all appearances, would yield considerable economic and social advantages. Without insisting that this suggestion is the only correct one, the editorial office expects a specific and practical response on the posed problem from the USSR State Committee for Science and Technology.

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CSO: 1814/65

INTERNATIONAL S&T RELATIONS

CEMA DEPUTY SECRETARY ON SCIENTIFIC, TECHNICAL COOPERATION

Moscow EKONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV SEV in Russian No 9, Sep 84 pp 11-13

[Interview with Deputy Secretary of the Council for Mutual Economic Assistance Ladislav Supka: "On the Path of Scientific and Technical Progress"; date and place not specified]

[Text] Question: At the Economic Summit Conference of the CEMA Member Countries the decision on the drafting of the Comprehensive Program of Scientific and Technical Progress for 15-20 Years was adopted. To what is this due? What tasks are being set for the program?

Answer: As is known, at present the most important condition of the steady development of the national economy and the increase of the well-being of the peoples of the fraternal countries is the changeover of the economies to the intensive means and the assurance of the complete utilization of the scientific, technical and production potential. This principle, which was advanced by the congresses of the Communist and workers' parties, follows from the Marxist-Leninist doctrine of the objective laws of the development of socialist production and the analysis of the present level and prospects of our national economy.

The large scientific and technical potential of the Soviet Union and the other CEMA member countries and its more efficient use are providing favorable opportunities for the acceleration of scientific and technical progress and the more rapid introduction of its achievements in production and in practice in general.

The 14th Congress of the Czechoslovak Communist Party specified the immediate tasks as follows: "The changeover to the intensive development of the economy requires the complete utilization of the achievements of the commenced scientific and technical revolution, modern methods of management and the highest forms of international socialist integration. The need for the combination of scientific and technical progress with socialism, which was formulated at the 24th CPSU Congress, is also becoming for us the only possible alternative of the further development of socialist society.... The congress considers it necessary to step up the pace of scientific and

technical progress, which is becoming a decisive lever of the development of the socialist economy."

As we see, the main role in the further development of the national economy of the CEMA member countries is being assigned to the stepping up of the pace of the intensification of production on the basis of the extensive use of the achievements of science and technology.

Regarding the utmost acceleration of scientific and technical progress as especially urgent, the participants in the Economic Conference came to an agreement on the joint drafting on the basis of national programs of the Comprehensive Program of Scientific and Technical Progress for 15-20 Years.

The program is called upon to become a basic international document, which reveals the strategic goals of scientific and technical cooperation within CEMA, and the basis for the formulation of a coordinated and, in several areas, unified scientific and technical policy. Its goal is the quickest solution by joint efforts of cardinal scientific and technical problems and the introduction of the achieved results in production in the interested countries on mutually advantageous terms.

In the program it is planned to envisage the creation on a collective basis of a theoretical reserve and to specify the priority tasks, the accomplishment of which will ensure the achievement of the world level of output, and particularly of machines and equipment, and thereby the strengthening of technological independence from the capitalist states.

I would like to direct attention to another aspect of the matter.

So that there would be the greatest and quickest impact from the measures outlined in the Comprehensive Program and they would be backed with material, financial and manpower resources, it is necessary on their basis to prepare and sign a number of general agreements. The drafting and scrupulous fulfillment of these agreements would promote the maximum utilization of the achievements of the scientific and technical revolution for the good of our peoples and the accomplishment of the most important task of the present stage of the building of socialism and communism--the changeover of the economies to the intensive means of development.

Question: In the Declaration on the Basic Directions of the Further Development and Intensification of the Economic, Scientific and Technical Cooperation of the CEMA Member Countries it is noted that today the fraternal countries are devoting particular attention to the sectors, which are revolutionizing production and are changing the structure and technical level of the national economy.

How will this be reflected in the Comprehensive Program of Scientific and Technical Progress?

Answer: Now, of course, it is still too early to speak about the specific content of the program. But one thing is clear: it should be aimed at the priority directions of the development of science and technology.

The following problems, in our opinion, are being brought to the forefront:

the introduction of electronics in the national economy and the complete automation of production on the basis of the mass use of microprocessor equipment and industrial robots. The solution of this problem will make it possible to increase labor productivity significantly and to accelerate scientific and technical progress in all the sectors of the national economy, including the nonproduction sphere and personal services;

the development and introduction of versatile adjustable automated production systems, which speed up significantly the process of changing over processing methods in case of changing economic needs, ensure the maximum utilization of capacities and greatly reduce the capital-output ratio;

the development and assimilation of new types of materials (plastics and synthetic resins, chemical fibers, composite materials), the development and introduction of new processing methods for the efficient use of raw material resources, the decrease of the power-output and materials-output ratios, the assurance of the increase of labor productivity;

the rapid development of atomic energy and its wide-scale introduction in the national economy not only for the generation of electric power, but also for the needs of central heating; the decrease on this basis in the structure of the fuel and power balance of the proportion of organic fuel;

the development of biotechnology for the meeting of the needs of animal husbandry for high quality fodders, the development of biological means of pest control, the increase of the yield of plants and the productivity of animals; the development on this basis of highly productive agricultural technologies, as well as effective medicinal preparations.

Question: One of the priority directions is the development of microprocessor equipment. How do things stand at present and what are the immediate prospects of the implementation of the general agreement on multilateral cooperation on its development and extensive use in the national economy of the CEMA member countries?

Answer: In recent years this new sector has been developing exceptionally rapidly. According to the calculations of specialists, at the end of 1980 about 250 million microprocessor systems and devices were in operation in the world. They have found application in more than 200,000 different types of industrial and household devices, which is a component of the technical revolution. It is anticipated that by the year 2000 this figure will increase to 5-20 billion, that is, 1 per inhabitant of the earth. Microprocessors and microprocessor systems continue to be introduced extensively in thousands of types of instruments, devices, machines and mechanisms and in various control systems. And this is making it possible to create more advanced technological conditions, to decrease the consumption of materials and energy and to increase product quality. In agricultural production, for example, microprocessors are making it possible to decrease the amount of fodders being used by 12-18 percent, to increase the milk yields by 4-10 percent, to

increase the crop yield by 2-5 percent by the decrease of the losses, in construction to decrease the consumption of cement by 5 percent, in transport to save up to 15 percent of the fuel on ships and in motor transport management from 3 to 8 percent.

Since 1982 the multilateral cooperation of the CEMA member countries in this area has been carried out in conformity with the General Agreement, which was signed during the 36th meeting of the CEMA Session. Its goal is the complete meeting of the needs of the countries for these types of latest equipment.

A component of the agreement is the Program on the Development and Extensive Use in the National Economy of Microprocessor Equipment for 1982-1990. More than 250 scientific organizations of the CEMA member countries took part in its drafting.

The CEMA Committee for Cooperation in Scientific and Technical Research carries out the coordination of the efforts on its implementation, as well as on the preparation of proposals on further directions of cooperation; the Intergovernmental Commission for Cooperation of the Socialist Countries in Computer Technology carries out the coordination of the efforts on the development and production of microprocessors and basic software.

The program is presently being implemented.

A set of measures on the development of automatic (automated) technological complexes, machines, instruments and control systems with the use of microprocessors is being implemented in individual sectors of the national economy.

However, not all the measures, which are envisaged by the program, are being fulfilled in the planned time. The needs of the countries for new items have not yet been fully determined, there are instances of the inadequate coordination of the technical requirements on the production of an item with the use of microprocessors within the countries. Much has to be done for the assimilation and the organization of the production of various types of auxiliary items of microprocessor systems.

Question: It would be interesting to our readers to know about the progress of the fulfillment of another general agreement--on industrial robots.

Answer: As is known, the development of industrial robotics is one of the most important national economic tasks in the majority of CEMA member countries. Since the problem is of an intersectorial and complex nature, these countries are striving to expedite its solution on the basis of effective cooperation.

The contacts in this area have been developing for several years now. Bilateral contacts--between Bulgaria, Hungary, the GDR, the USSR, the CSSR and the other fraternal countries--were established in the middle of the 1970's. Mutual familiarization with the national programs of the development of robotics enabled them to coordinate efforts at the first stage in the sphere of scientific and technical development.

The following figures attest to the growth rate of robotics in our countries. Whereas in 1975 250 robots were used under production conditions in the USSR, in 1980 their stock amounted to nearly 6,600 units. In Bulgaria in 1980 230 robots were introduced, in the GDR, Poland and the CSSR approximately 300 robots each were introduced. In the immediate future their number should increase significantly and in 1985 in the USSR, for example, should reach the level of 40,000 units.

Today robots for the most part "have received admission" in machine building--in machining, assembly and welding. No less extensive prospects are also being afforded them in other sectors: the mining, metallurgical and petroleum sectors, in transportation and construction, in light, the food and the fish industries, agriculture, health care, in services, scientific research, including of the oceans and space.

A new stage of the cooperation of the CEMA member countries in industrial robots began in recent years. In 1980 an agreement on multilateral scientific and technical cooperation on the development of modern industrial robots for various sectors of the national economy was concluded. Joint operations, which have already made it possible to assimilate the production of nearly 150 different types of robots in an arrangement with basic technological equipment, are being performed on its basis.

An agreement on the multilateral international specialization and cooperation of production, on the basis of which the division of labor in the production of 58 type sizes industrial robots is being developed, was also signed. About 75 percent of the range will be produced in 1-3 countries, which will meet the needs of the other countries which are parties to the agreement.

As practical experience shows, in the process of the intensification of cooperation it is necessary to settle more comprehensively the questions of unification and standardization and to coordinate more extensively and efficiently the efforts of the countries in this area.

In this connection in 1982 the General Agreement on Multilateral Cooperation on the Development and the Organization of the Specialized and Cooperative Production of Industrial Robots was signed during the 36th meeting of the CEMA Session. It poses the task to ensure on the basis of the international socialist division of labor the more complete meeting of the needs of the countries for industrial robots and their unified modules, assemblies and parts, as well as for auxiliary devices and attachments, which make it possible to design robotized technological complexes.

The coordination of operations within the general agreement is being carried out by: the CEMA Committee for Cooperation in Scientific and Technical Research (in the area of the formulation and subsequent specification of the Concept of Technical Development) and the CEMA Permanent Commission for Mechanical Engineering (the accomplishment of specific scientific and technical tasks and the organization of the specialized and cooperative production of robots and their unified components).

At present in conformity with the general agreement the Council of Chief Designers for Robotics has been formed, the coordination of the concept of the technical development of the sector has been completed and the basic group of designs of industrial robots, which are being developed by joint efforts, has been specified. For this purpose the Consolidated Priority List of Industrial Robots and Their Components, as well as consolidated specifications for them have been prepared. Here it is important that the needs of the potential users of means of industrial robotics have been taken into account, much attention is being devoted to the development of systems of programmed control and hydraulic and pneumatic equipment. A program of the complete standardization of means of industrial robotics to 1990 has also been prepared. This work was carried out within the CEMA Committee for Cooperation in Scientific and Technical Research, 20 sectorial permanent commissions of CEMA and the Interelektro International Economic Organization.

However, there are still a number of problems, on the solution of which CEMA organs, guided by the conclusions of the Economic Summit Conference of the CEMA Member Countries, at present have focused attention.

In conclusion I want to note that the fraternal countries have much experience in the solution by joint efforts of large-scale scientific and technical problems. Suffice it to recall how successful their cooperation in the development of the Unified System of Computers and Equipment for Atomic Power Plants was. Today the Communist and workers' parties of the fraternal countries have posed the task: to achieve the maximum utilization of the achievements of the scientific and technical revolution. And we are confident: it will be fulfilled. This will be in the interests of both each fraternal country and the entire socialist community.

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CSO: 1814/55

INTERNATIONAL S&T RELATIONS

GDR, CSSR OFFICIALS ON COOPERATION IN SCIENCE, TECHNOLOGY

Editorial Statement

Moscow EKONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV SEV in Russian No 9, Sep 84 p 14

[Article: "The Leading Unit of Economic Strategy"]

[Text] The Economic Summit Conference of the CEMA member countries, which took place in Moscow on 12-14 June 1984, marks the transition to a qualitatively new stage of the cooperation of the fraternal countries and the coordination of their economic policy.

Having analyzed the formed situation, the conference participants came to the unanimous conclusion: the acceleration of scientific and technical progress and the quickest introduction of the achieved results in production on mutually advantageous terms are the leading unit of the economic strategy of the countries of the socialist community at the present stage and in the foreseeable future. Today the center of gravity in the development of the national economies and in the improvement of the two socioeconomic systems has been shifted precisely here. Therefore the uniting of the scientific and technical potentials of the fraternal countries, the joint elaboration by them of a scientific and technical policy and priority problems and their realization on the basis of agreements are acquiring particular importance. The accomplishment of these tasks will make it possible to decrease significantly the costs and the time of the development of new generations of highly productive equipment for the retooling of all the sectors of the national economy and the organization of their mass production.

An understanding on the joint drafting on the basis of national programs of the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries for 15-20 years was reached for the concentration of the efforts of the fraternal countries on the decisive directions of the development of science and technology.

What gains the fraternal countries have achieved in the development of the priority sectors, how the cooperation in these sectors is presently being broadened and intensified and what the plans for the immediate future are, were discussed during a conversation in Moscow of our correspondent with State

Secretary of the GDR Ministry for Science and Technology Klaus Stubenrauch and Deputy Chairman of the CSSR State Commission for Research and Development and Investment Planning Academician Ladislav Kubicek. They answered the following questions of the Main Editorial Office:

1. What measures on the increase of the efficiency of socialist production, and particularly on the rapid development of electronics, microprocessor engineering and robotics, which were discussed at the Moscow conference, are being implemented in your country?

2. In which of the joint measures of bilateral and multilateral cooperation, which are aimed at the solution of the key problems of science and technology, is your country participating, and what specifically has already been done?

3. Which problems, in your opinion, should be the main ones in the Comprehensive Program of Scientific and Technical Progress for 15-20 Years?

4. What forms of cooperation are most effective for the successful solution of these problems?

Stubenrauch Responses

Moscow EKONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV SEV in Russian No 9, Sep 84 pp 14-17

[Interview with State Secretary of the GDR Ministry for Science and Technology Klaus Stubenrauch by an EKONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV SEV correspondent: "Unite the Advantages of Socialism With the Achievements of the Scientific and Technical Revolution"; date not specified; passages rendered in all capital letters printed in boldface in source]

[Text] I

Answer: First of all I would like to note that the Politburo of the SED Central Committee and the GDR Council of Ministers fully approved of the documents of the Moscow conference and concentrated attention on the fact that the acceleration of scientific and technical progress and the increase of its effectiveness are the most important factors of the intensification of production in the fraternal countries. This line is in full accord with the policy of the 10th SED Congress, which indicated the need to unite the advantages of socialism with the achievements of the scientific and technical revolution.

The task is to shorten the time of the performance of scientific research and planning and design work and to achieve the development of the latest highly productive machines, equipment and processing methods, which are not inferior to the best domestic and foreign models, and their quickest introduction in the national economy.

We are attaching particular importance to the development of the sectors, which are revolutionizing production and are ensuring qualitative changes in its structure and technical level. "The development of microelectronics, computer technology and automatic control equipment, the production of plastics and chemical fibers, machine tool building and the microbiological industry, which govern scientific and technical progress," Comrade Erich Honecker said at the 10th SED Congress, "is at the front line."

In conformity with the five-year plan of national economic development for 1981-1985 the priority growth of these sectors is envisaged in the GDR.

Let us take, for example, microelectronics. Tens of types of microelectronic components, including new types of integrated circuits, have been produced in the country.

Microelectronics will make it possible to carry out the extensive replacement of generations of the most important means of rationalization, first of all computer technology, automation and control, as well as scientific instrument making. The proportion of machines with the use of microelectronics in the total assortment of products of machine tool building will come in 1985 to more than one-half.

The substantial acceleration of the development and use of industrial robots is of particular importance for the resolute change of the technical and technological level of our national economy. They are playing an important role in the automation of production processes, the freeing of manpower and the decrease of monotonous operations, which are harmful to the health and physically difficult. Today the setting up of centralized works for the production of both finished machines and component assemblies and parts, including electronic controlling systems and electric and hydraulic driving mechanisms, is being planned in the leading sectors of industry.

What has already been done for the achievement of the outlined goals in these sectors? What results have we achieved during the years of the current five-year plan?

Capacities for the production of items of microelectronics and electrical engineering were put into operation at the K. Marx Microelectronics Plant in Erfurt and the semiconductor plant in Frankfurt an der Oder, silicon disks--at the microcomponent plant in Freiberg, special machines and printed circuit boards--at the plant of contact elements and special machine building in Hornstorf, special equipment for microelectronics--at the Research and Technological Institute in Dresden. Thereby the prerequisites were created for the further use of microelectronics in various sectors of the national economy.

The gains in the development of robotics are even more significant. A large number of capacities were also put into operation here, including at the Central Design Bureau of the Metallurgical Industry in Berlin, at the enterprise for the production of means of rationalization in Wittstock, the chemical equipment plant in Leipzig, the Union Plant of Metal Working Machine

Tools in Gera and the H. Matern Machine Tool Building Plant in Magdeburg. These and other measures, which were implemented in conformity with the decisions of the 10th SED Congress, made it possible to introduce industrial robots more extensively in various sectors of the national economy.

Much was also done during the past years of the current five-year plan in the development of other priority directions of machine building and the other leading sectors of the national economy. This is contributing to the accomplishment of the main task of the current decade--the changeover of the GDR economy to the intensive means of development.

II

Answer: The tasks, which face the fraternal countries at present, are most complex and diverse. And a single country is not capable of their accomplishment alone.

Historical experience teaches and present reality confirms: the socialist states achieve the best results when they unite efforts and work with an aim at the needs of our entire community. The combining of material, financial and manpower resources for the solution of such most important problems under present conditions as the fuel and energy and the raw material problems attests precisely to this. The cooperation in the development and production of third-generation computers of the Ryad Unified System and small computers, the organization of the specialized and cooperative production of equipment for nuclear power plants and others testify precisely to this.

Bilateral relations are also yielding a large impact. Suffice it to name the Program of the Specialization and Cooperation of Production Between the GDR and the USSR for the Period to 1990. Its implementation is contributing to the increase of the efficiency of the national economy of our two fraternal countries and to the improvement of the quality and technical level of the products being produced by us in such leading sectors as machine building and power engineering, metallurgy and the chemical industry, light and the food industries. Bilateral contacts are also called upon to play a large role in the solution of the food problem and in the development of the agroindustrial complexes of the GDR and the USSR.

Now a most important economic and political task faces us--to achieve in the shortest possible time the heights of scientific and technical progress in the principal, key sectors, which ensure the cardinal increase of labor productivity, the maximum saving of resources and the steady increase of the quality of the items being produced, and to set up the production of many of them, and particularly machines and equipment at the world level.

The technical and production potential, which we have, is making it possible to accomplish this task. For this it is necessary to fulfill the instructions of the congresses of the Communist and workers' parties of the fraternal countries--to turn the 1980's into a period of intensive production, scientific and technical cooperation.

We will perform work, as they say, not from scratch. In recent years much has already been done. Multilateral agreements (contracts) on the development and the organization of the specialized and cooperative production of a number of types of modern highly efficient equipment and new materials have been signed and are being successfully implemented. Among them are metal-cutting machine tools (including with numerical control), automatic lines, special and heavy-duty single-design machine tools, as well as component items, assemblies and technical accessories for them; computer equipment; microelectronic-based items for this equipment, as well as special technological equipment and ultrapure materials for microelectronics; equipment for nuclear power plants; industrial robots and others. I would like to direct attention to another agreement--on multilateral cooperation on the development and extensive use in the national economy of microprocessor equipment.

It is especially necessary to note that all these international legal acts envisage the development, production and reciprocal deliveries of not simply some types of items or others, but also--what is the main thing--items of a high technical level which corresponds to the best world models.

The GDR is a party to all these agreements. In each of them it has its own "section" of operations. And this means that it specializes in the production of specific types of machines, equipment, units and instruments, moreover, with allowance made for both its own needs and the needs of its partners. For example, in atomic power machine building its "section" is overhead cranes and other equipment; in the production of items based on microelectronic components--optical mechanical, analytical and control and measuring equipment and so on. Much work is also being performed by scientific research institutes, design bureaus and enterprises of the GDR for the implementation of other multilateral agreements.

Along with this we have signed and are fulfilling our obligations on bilateral agreements which envisage the development and production of the latest equipment. I will dwell specially on one of them--on cooperation between the GDR and the USSR in the area of microelectronics.

The first agreement was signed in December 1977. However, the needs of various sectors of our two fraternal countries increased so rapidly that the need for the conclusion of a new agreement arose. It is of a comprehensive nature and envisages the broadening and extension of scientific, technical and production relations and--what is the main thing--the significant increase of reciprocal deliveries.

The almost 3 years, which have passed since the second agreement was signed, have shown how much we can achieved when we concentrate efforts on the most important problems.

As a whole we have signed with the USSR more than 200 agreements on production, scientific and technical cooperation in various sectors of the national economy and approximately the same number with the other CEMA member countries. This is yielding positive results and is helping us and our friends to advance more successfully in economic development.

III

Answer: Now, as is indicated in the documents of the Economic Summit Conference, the task is to take a new important step in the cooperation of the fraternal countries in the area of science and technology. Only in this way can we use most efficiently our production, scientific and technical potential and avoid parallelism and duplication in operations. Only by this means can we concentrate forces and assets on the decisive sections and achieve the maximum results.

In 1984 we are celebrating the 35th anniversary of the founding of the GDR--the first socialist state on German soil. All these years our development has taken place in close contact with our friends and partners from the Council for Mutual Economic Assistance, including in the solution of the most important scientific and technical problems. And we know how effective this cooperation is, which is based on the Leninist principles of socialist internationalism and takes into account the interests and possibilities of each country.

Our cooperation today is also developing precisely on the basis of these principles. I want to direct your attention to one, it would seem, small, but very important detail. The Comprehensive Program of Scientific and Technical Progress for the Period to 1990, which we are now beginning to draft, will be based on the national programs in this area. And this is discussed directly in the documents of the Moscow conference.

Hence, here, too, the interests of each country will be taken as much as possible into account and the problems, which are of the greatest interest to us and correspond to the tasks which were posed by their Communist and workers' parties, will be solved. This is also important because each country will begin the implementation of the comprehensive program having the appropriate staffs of specialists, scientists and engineers and the appropriate capacities in industry, in other words, will be ready to make a worthy contribution to the common cause.

And there is another question on which I would like to dwell before moving to the specific problems, on the solution of which, in our opinion, efforts should be concentrated.

As is known, when fulfilling any tasks it is necessary to seek and find the main, key ones. Therefore, it seems to us, it is necessary to narrow drastically the group of problems, with respect to which we wish to unite efforts, and to leave those which will make it possible to achieve qualitative changes in the structure and technical level of the entire national economy and a change of its very character.

What problems are these?

1. THE DEVELOPMENT OF MICROELECTRONICS, COMPUTER TECHNOLOGY AND COMMUNICATIONS EQUIPMENT FOR THE INCREASE OF THE DEGREE OF AUTOMATION OF WORK AND INFORMATION PROCESSES. The development of new technological processes and special equipment for microelectronics and optoelectronics, as well as highly

productive microelectronic circuits. The development of new principles of the action of components, particularly optical integrated circuits for light-guide and laser equipment; the comprehensive treatment of design operations and production processes by means of computer, as well as the automated control of the processes of production and supply. Operations on the simplification of man-machine dialogue.

2. THE INCREASE OF THE TECHNICAL LEVEL AND DEGREE OF AUTOMATION IN MACHINE BUILDING. The setting up of versatile automated production sections.

3. THE EFFICIENT GENERATION AND USE OF POWER.

The overall optimization of power-consuming processes by the development of new processing methods and the use of power electronics. The development and introduction of new technical and technological approaches and optimum assembly and installation techniques for nuclear power plants, the complete assurance of nuclear and technical safety, the automated (by means of computer) control of operation for the purpose of providing operating conditions which save equipment, as well as a higher degree of reclamation of nuclear fuel. The development of combined systems for the testing of materials with remote control and a high degree of automation.

4. THE DEVELOPMENT OF NEW MATERIALS AND PROCESSING METHODS. THE MORE THOROUGH PROCESSING OF RAW MATERIALS AND THE MAXIMUM USE OF SECONDARY RAW MATERIALS AND WASTE PRODUCTS. The development of scientific and technical approaches for the preparation of raw materials, as well as the refining of all the components of petroleum, which can be converted into light products. The complete recovery of the gaseous and liquid products of the enrichment of coals, including cokes of different quality, as a raw material. The supply of the necessary primary resources and production facilities for the obtaining of new materials. The development of methods of the enrichment and energy-saving processing of large-tonnage waste products and secondary resources.

5. THE DEVELOPMENT AND USE OF BIOTECHNOLOGY. The development and use of genetic and immune engineering and methods of the cultivation of cells and enzymes for the obtaining of products for agriculture, the food industry, medicine and veterinary science and the increase of the yield and productivity of animal husbandry and plant growing, as well as biotechnological methods of the use of domestic raw material resources and waste products for the industrial obtaining of protein fodders, energy carriers and chemicals, the production of pharmaceuticals and diagnostic agents, vaccines and biochemicals and the solution of the problems of environmental protection.

IV

Answer: I have been dealing for more than 20 years now with the questions of economic, scientific and technical cooperation with the fraternal countries and was a witness to how step by step this cooperation broadened and intensified and new, more efficient and advanced forms of cooperation were used.

As to science and technology, as is known, we began with a simple thing--the exchange of advanced know-how and achievements, that is, what we already had and could share with friends.

Today we have moved to such a stage when we develop a new thing together and, as socialist countries, do this on a planned basis, that is, we reach in advance an understanding on which country will solve which portion of the problem, and not only in the development of some machines and component units or others, but also in the introduction of finished items. We are implementing the outlined measures on a contractual basis.

Now we should, apparently, go farther and also use other forms of cooperation, which have justified themselves, and, perhaps, think of new ones.

What do I have in mind? We have already said how effective our cooperation in the development of the Unified System of Third-Generation Computers was. Cooperation in the production of equipment for nuclear power plants is also being developed fruitfully. One of the factors of success in both cases is the fact that the understanding on cooperation was reached at an intergovernmental level. And this made it possible to concentrate the necessary material, financial and manpower resources on the accomplishment of the tasks. The coordination of the activity of the parties to the agreement is carried out by intergovernmental commissions at the level of the deputy heads of the governments, which is also playing an important role and is conducive to the prompt solution of arising problems. Therefore, it seems to me, it is necessary to use this form more extensively when implementing the Comprehensive Program of Scientific and Technical Progress.

In the Declaration on the Basic Directions of the Further Development and Intensification of the Economic, Scientific and Technical Cooperation of the Member Countries, which was adopted at the Economic Summit Conference, other effective forms of cooperation are also discussed--joint firms, enterprises and other international economic organizations, which operate on a cost accounting basis. Taking into account the specific nature of the problems, they will contribute to the success of the matter. Direct contacts between related scientific research and design institutions, as well as enterprises of the fraternal countries are also of great importance.

Thus, along with the forms, which exist and have justified themselves, it is necessary to seek new ones, which will make it possible to organize closer cooperation at the level both of ministries and of combines and enterprises, and thereby "to put to use" all reserves.

In conclusion I want to express confidence that the implementation of the adopted decisions will provide a new stimulus for the further progressive development of our economies and will contribute to the solution of problem No 1 at the present stage--the changeover of our national economies to the intensive means of development.

Lubicek Responses

Moscow EKONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV SEV in Russian No 9, Sep 84 pp 18-21

[Interview with Deputy Chairman of the CSSR State Commission for Research and Development and Investment Planning Academician Ladislav Lubicek by an EKONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV SEV correspondent: "The Assurance of Scientific and Technical Development Is a Truly Revolutionary Task"; date not specified]

[Text] I

Answer: I would like to begin our conversation with one, at first glance ordinary, but very important report which recently appeared in our press. The Center for the Training of Specialists for work with systems of small computers, which are distinguished by the high speed of data processing and more advanced programming, was opened in Pardubice.

The Pardubice Center is the "first portent" in this new, most necessary matter. By the end of the current five-year plan it is planned to set up more than 50 such educational institutions in the main industrial centers of Czechoslovakia. They will be furnished with the latest equipment. Developers and engineers, who specialize in the production of "intelligent machines," will engage in the training of young enthusiasts. As a whole in the next few years it is proposed to train more than 100,000 highly skilled specialists who will service new equipment.

People may ask: To what is this boom due? To the rapid development of computer technology in the country, the place and the role, which it is playing in the accomplishment of the most important task, which was posed by the 16th Congress of the Czechoslovak Communist Party, on the changeover of the economy to the intensive means of development.

I will recall that back at the beginning of the current five-year plan more than 1,500 large computers and more than 2,000 specialized computer centers were in operation in the country. At present in Czechoslovakia one computer model or another is in operation at practically every enterprise, transshipping center and production association. This equipment is being used efficiently for the solution of diverse production and economic planning problems. In industry, for example, the average daily level of the use of computers has reached 3,770 hours. This means that each of them "works" daily nearly two work shifts.

The automation of production processes in such key sectors as machine building, and machine tool building in particular, metallurgy, the chemical industry and others is being sped up significantly by means of computers.

As is known, the scientific and technical revolution, which is occurring in the world, is posing in a new way a large number of questions of economic development and requires the revision and, in a number of instances, a

cardinally different approach to the planning of economic development. What do I mean?

Previously the main task of planning organs was to include in national economic programs more assignments, moreover, as a rule, ones which were aimed at quantitative growth. At present the picture is different. Today only whoever knows how to approach a question selectively, is a good planner. In other words, knows how to select the key, priority problems, on the solution of which the success of the matter depends, and to focus on them the attention of economic organs and scientific research and planning and design institutions.

To put it figuratively, the task is to find a "point of rest," which would make it possible to raise socialist production to a new, qualitatively higher level and to achieve a sharp increase of its efficiency and the quality of the items being produced. Today scientific and technical progress is such a "point."

The 16th Congress of the Czechoslovak Communist Party proceeded precisely from this when it adopted the policy of the acceleration and the maximum utilization of the achievements of the scientific and technical revolution. "Science and technical progress," Comrade Gustav Husak said in the Accountability Report of the Central Committee of the Czechoslovak Communist Party to the congress, "are the decisive factor of intensification and the strongest source of the increase of the productivity of national labor. The assurance of scientific and technical development is a truly revolutionary task of our entire society. Only on the basis of the introduction of the achievements of science and technology is it possible to develop the most advanced sectors, electronics and microelectronics, complete mechanization and automation, to eliminate difficult physical labor, to spread advanced technology, to improve management and the organization of labor."

The Basic Directions of CSSR Economic and Social Development for 1981-1985, which were approved by the congress, were also drawn up in this key. They proceeded from this policy when drafting the five-year plan for this period. They envisage the nearly threefold increase of the production volume in electrical engineering, electronics, optoelectronics and especially microelectronics. Much attention is being devoted to the assimilation and the expansion of the production of microprocessors with the use of modern technological equipment, as well as computer equipment, bipolar and unipolar integrating circuits, industrial robots and manipulators.

These tasks are being successfully fulfilled. Last year, for example, the production of integrated microcircuits increased by 20 percent, robots and manipulators--50 percent, digital computers--almost threefold. Their extensive use in combination with other advanced equipment, particularly NC machine tools, promoted automation in industry, transport, construction, communications, agriculture and other leading sectors. Atomic power machine building and other structure-determining industries are also developing rapidly. The achievements in the economical use of raw materials, fuel and power are significant.

As was indicated at the 16th Congress of the Czechoslovak Communist Party, goal programs are called upon to play an important role in the concentration of material, financial and manpower resources on the key problems of science and technology and the assurance of a comprehensive approach to their solution. Being a component of the State Plan of Technical Development of the CSSR, they are contributing to the increase of the efficiency of the work of scientific research and planning and design institutions and their interest in the practical implementation of the achieved results and the substantial shortening of the scientific research--technical development--production--use cycle.

In this connection the task: newly developed items should correspond to the best world models, should have low materials-output and power-output ratios and should be produced promptly and in sufficiently quantity, and both for the domestic market and for export, has been posed for the Federal Government, the governments of both republics--the Czech Republic and the Slovak Republic, and particularly for our State Commission and its organs, as well as the Czechoslovak Academy of Sciences.

Such goal programs, which are aimed at the rapid development of the scientific and technical potential, have been and are being drafted in the other fraternal countries. In the Soviet Union, for example, 170 such programs, which were prepared by the State Committee for Science and Technology, the State Planning Committee and the State Committee for Construction Affairs, as well as the USSR Academy of Sciences, are being implemented during the current five-year plan.

Now, as was agreed at the Economic Summit Conference, the task is to draft on the basis of these national programs the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries for 15-20 Years. It will be the basis for the formulation of a coordinated and, in several areas, a unified scientific and technical policy. The program has as a goal the quickest solution by joint efforts of cardinal problems of science and technology and the introduction of the achieved results in production in the interested countries on mutually advantageous terms.

We are approaching the new stage of cooperation--and it is necessary to speak frankly about this--with a quite large "reserve." I have in mind the experience and the gains, which we have made, by uniting efforts in the development of the latest highly productive equipment and in the organization of its mass, series production.

II

Answer: Let us begin again with computer technology, especially as in cooperation 1984 is for it a double anniversary year. This year it is 15 years since the agreement on the uniting of the efforts of the fraternal countries in the development of the Ryad Unified System (YeS EVM) was concluded and 10 years since the decision was made on the joint development and production of the system of small computers (SM EVM). Today 30 scientific research and design bureaus and more than 70 plants of the fraternal

countries, at which more than 300,000 people are employed, are taking part in the implementation of these large-scale plans.

Czechoslovakia is one of the countries which are participating in the cooperation in the area of computer technology. Its specialists have made a substantial contribution to the development of this new, promising sector, which is playing a most important role in scientific and technical progress and in the furnishing of the entire national economy with the latest equipment. Owing to their efforts a number of models of generations 3 and 3.5 of the Ryad system (YeS-1021, YeS-1025 and YeS-1026), as well as small computers (SM-5040), problem-oriented complexes with the use of processors, a wide assortment of peripheral devices and papertape photoelectric readers for the supply of computers, punchcard computer aids and others received "a start in life."

Our country is also actively participating in other operations which are being performed within the Intergovernmental Commission for Computer Technology. Among them are the concepts and the architecture of promising computers of the Unified System, the microelectronic base, technology and design of peripheral devices. Along with this we are now working on complex tasks on the development of new models of the Ryad system and small computers.

Cooperative relations among the fraternal countries are also being successfully developed. The plant in Banska Bystrica, for example, receives component assemblies and parts from related plants in Minsk (USSR) and Erfurt (GDR). Owing to broadening cooperation during the next five-year plan it will produce about 19,000 small computers. A portion of them will be delivered to the countries which are parties to the agreement.

Computer technology is one of the sectors governing scientific and technical progress, in the development of which effective cooperation has been organized within CEMA. At present multilateral cooperation in the development, production and reciprocal deliveries of highly productive machines has also received extensive dissemination in other sectors. The contacts in machine tool and tool building, in electrical engineering, microprocessor technology and robotics and in the production of equipment for atomic energy are especially intensive. In recent years multilateral agreements, which have as a goal the more and more complete meeting of their needs for modern equipment for the most important sectors of the national economy, have been signed between the fraternal countries on all these priority directions.

Czechoslovakia is taking part in all these measures. As was indicated at the 16th congress of our Communist Party, we can achieve the acceleration of scientific and technical progress in the decisive sections only by the purposeful extension of cooperation with the other CEMA member countries, and first of all with the Soviet Union. The pledge of our successes and the guarantee of the future of our country are in the USSR and in integration with its enormous production, scientific, technical and spiritual potential.

As you know, today with allowance made for our own needs and the needs of our CEMA partners we are producing VVER-440 reactors and several other types of basic equipment for nuclear power stations. Starting in 1987 we will produce

more powerful equipment, particularly VVER-1000 reactors. The development of the new subsector of machine building, which is ensuring profound structural changes in our national economy, became possible owing to cooperation with the Soviet Union. Precisely with the assistance of Soviet specialists we will organize a new works at the Skoda National Enterprise in Plzen, at the Vitkowice K. Gottwald Metallurgical and Machine Building Combine, the Sigma Plant in Olomouc and others. Precisely on the basis of documents received from the USSR we obtained the opportunity to join in the international socialist division of labor in this area and thereby to make our own contribution to the rapid development in the fraternal countries of a new highly efficient sector--atomic power engineering.

Cooperation with the CEMA member countries, and first of all with the Soviet Union, also played a most important role in the development in our country of such a catalyst of scientific and technical progress as robotics.

The introduction of industrial robots, completely automated machine tools, lines and systems, which free man from difficult physical labor, is one of the main directions of the vast work which is being performed today in the fraternal countries on the changeover of the economies to the intensive path of development. Let us recall that the comprehensive use of robots makes it possible to increase labor productivity by 1.5- to 2 fold and the machine shift coefficient by 1.5- to 1.8-fold and to improve significantly the smoothness of production. Its importance is also great in the accomplishment of such a social task as the all-round development of the individual and in the achievement, using the words of K. Marx, of the all-round humanization of social and individual life.

Today the VUKOV Scientific Production Association in Presov is the main organization for the development and production of industrial robots in Czechoslovakia. Its collective established the first contacts with colleagues from the USSR soon after its establishment. The assistance of Soviet specialists enabled us to solve in the shortest possible time a number of most difficult problems.

The contacts of VUKOV with the Moscow Experimental Scientific Research Institute of Metal-Cutting Machine Tools (ENIMS) are especially intensive. In accordance with its technical specifications the second-generation UM-160 industrial robot, which was commended in 1982 by a gold medal at the International Trade Fair in Brno, was developed in Presov.

In 1981 the Comprehensive Program of Cooperation in the Area of the Development and Production of Automatic Manipulators With Programmed Control for Various Sectors of the National Economy was signed between the CSSR and the USSR. Three leading Czechoslovak and six leading Soviet machine building ministries and a large number of scientific research and planning and design institutes and organizations are taking part in its implementation. And this is already yielding appreciable results. Robots, which were developed with the participation of Soviet specialists, today are installed at many large enterprises of our country: the East Slovak Metallurgical Combine in Kosice, the Skoda Motor Vehicle Works in Koprevnice, the machine building plant in

Dubnice nad Vagom and others. They have also been delivered to a number of Soviet enterprises.

III

Answer: The Comprehensive Program of Scientific and Technical Progress for 15-20 Years, the decision on the drafting of which was made at the Moscow conference, marks the beginning of a new stage in the cooperation of the CEMA member countries and in the development of socialist economic integration. It is called upon to become a truly guiding document of joint actions in science, engineering and technology and in the mass introduction of their achievements in production.

The program is aimed at the supply of the national economy of the fraternal countries with machines and equipment of high quality and at the world technical level and at the rapid development of the key sectors, which ensure the cardinal increase of labor productivity, the maximum saving of resources, the improvement of the structure and the retooling of all socialist production.

It is possible to solve this problem in several ways. It is possible, of course, to broaden more and more the spheres of cooperation, encompassing by it newer and newer areas. At first glance this means is very tempting. As they say, to kill two birds with one stone. But how practicable is it? I and my colleagues from the other fraternal countries believe that this means is not capable of providing the maximum impact. For if we set to work at once on 1,000 problems, even though they are most important ones, we will not completely solve any of them and will not achieve the highest indicators.

But we need--and this was emphasized with new force at the Economic Conference in Moscow--to obtain the greatest yield and to achieve the heights of scientific and technical progress in all the problems which we are now undertaking to solve together.

Therefore, in our opinion, today we should concentrate efforts on the following most important directions:

1. The development and use of electronics and microelectronics in the national economy, including household electronics.

2. The automation and robotization of selected processes of the production and nonproduction sphere of the national economy.

3. New construction materials, which have the highest consumer properties, and their efficient use. New advanced processing methods and their use in the decisive sectors of the national economy for the purpose of the better use and saving of fuel, energy and raw materials.

4. More advanced and new methods of the supply of fuel and energy resources and their conversion, including atomic energy, new and renewable energy sources and the efficient use of all forms of energy.

5. The development and use of biotechnology in the national economy.

The basic forces and assets both in basic and applied research and in technical development and experimental design operations should be concentrated on these directions.

IV

Answer: First of all I want to note that here it is necessary to proceed from the main thing--what form will make it possible to solve best not only the first part of the problem--the development of new machines and equipment, new materials, the development of new advanced processing methods. The choice of forms should also be predetermined by another thing: which of them will help to achieve more rapidly the end results, to introduce them in the national economy, to organize specialized and cooperative production for the output of the necessary products.

This, in our opinion, should be the basic criterion when determining the mechanism of the implementation of the decisions of the Economic Conference in general and the Comprehensive Program of Scientific and Technical Progress in particular.

What does our experience suggest in this respect?

As we have already said, in 1981 an agreement on cooperation in the area of robotics was signed between the CSSR and the USSR. In development of this agreement in December 1983 the Robot Temporary Soviet-Czechoslovak Planning, Design and Technological Bureau was established under the auspices of the VUKOV Scientific Production Association. And although only the first steps have been taken, it can already be said: this is an effective form of the uniting of the efforts of the fraternal countries. As is known, such a bilateral bureau at one time was organized for induction motors. It also completely justified itself and subsequently "developed" into a multilateral organ within the Interelektro International Economic Organization.

Today an understanding on the establishment of the Interrobot bilateral international organization has been reached between Czechoslovakia and the Soviet Union. It will begin to operate on 1 January 1985. In this connection I would like to direct attention to two things:

the equipment being developed should correspond to or be higher than the world level;

a production base is being provided for the introduction of new developments.

Our experience also attests to the fruitfulness of other collective forms of cooperation, such as the intergovernmental commissions for computer technology and for atomic energy. They are contributing not only to the coordination of efforts, but also to the organization of scientific, technical and production cooperation on a contractual basis and back the measures being outlined with resources.

Large international centers like the Joint Institute for Nuclear Research in Dubna (USSR) are also most effective. They could also make a significant contribution to the scientific and technical progress of the fraternal countries and contribute to the joint solution of the most important national economic problems which have been posed by the Communist and workers' parties.

To summarize, it should be noted: today new difficult tasks face us. The Economic Summit Conference formulated a unified strategic policy and specified the basic directions of cooperation of the fraternal countries for the long-term future.

The implementation of this policy will lead to the further strengthening of our unity and solidarity and will contribute to the increase of the economic might of both each individual country and the entire socialist community as a whole.

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CSO: 1814/55

SOCIO-POLITICAL FACTORS

SOCIAL CONSEQUENCES OF AUTOMATION UNDER SOCIALISM, CAPITALISM

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 26 Dec 84 p 3

[Article by P. Gurevich, chief of a sector of the Institute of Philosophy of the USSR Academy of Sciences: "Automation: Consequences and Prospects"]

[Text] Everything that mankind has achieved, has occurred in an inconceivably short time and with a gigantic build-up. Try to imagine the development of mankind as a 60-km race, having arbitrarily equated every 10,000 years of its development to 1 km. A large part of this distance will prove to be beyond civilization. Only at the 58th kilometer will the first implements of labor and cave drawings--the beginnings of culture--appear. Only at the 60th kilometer will we find signs of agriculture, and 10 m before the finish line--the Roman road which is covered with stone slabs. The last 10 m begin by the dim light of kerosene lamps, but in the final spurt, in the very last meters a stunning miracle will occur: electric light floods cities, motor vehicles race along, jet airliners soar into the sky, and the flashes of "flash attachments" and "floodlights" of press photographers and television cameramen blind the astonished runner.

Yes, we live in a remarkable age. Time has been compressed like a "black hole"--it draws everything in and cuts off the ways back. Two more decades have passed since the time when not one, perhaps, science fiction story or novel did without such active "characters" as "intelligent" automatic machines, which either help man to live or enslave him, elevate the individual or incite him to degradation. Philosophers, sociologists and economists followed the science fiction writers. There were innumerable predictions of an "automated existence." Today automation, cybernitization, robotization, "the microprocessor revolution"--the words and combinations from them in spirit and in meaning not only have become firmly established in our lexicon, but have also been materialized in specific matters of our life.

It is now a question not of whether or not it is possible to do without automated equipment. Reflecting the real and profound processes of the scientific and technical revolution, it is placing production and the entire style of our life at the threshold of unheard of changes. Today robots "are mastering" tens of "delicate" occupations. Only a few rapid strokes of the "arms," and an electronic clock is assembled. But previously for this tens of assemblers had to perform about 400 operations. Automated plants are being

built. The development of computer technology is making it possible to use information differently not only at the works, but also in all areas of the life of society--in administration, education, medicine, services and environmental protection. The computerization of education is on the agenda: computer-aided systems of instruction are helping students, particularly undergraduates, to "play" repeatedly technical and production situations, to penetrate more deeply their mechanism and to check their own knowledge.

What will the social consequences of automation be?--this is the question which worries both those, who have already come across this equipment, and of those, who are just going to meet with it. The Club of Rome, which prepared a report on the theme "Microelectronics and Society," prefaced it in its own way with the symbolic heading: "For Joy or for Sorrow." Whether the authors of the report wanted it or not, they all the same reflected an understanding of the fact that the social consequences of automated equipment depend not on it, but on the nature of the social system. And this is the most important understanding, which the scientific and technical revolution is bringing into the consciousness of people.

Automatic lines, robots and computer technology are being introduced in both the socialist and the capitalist countries. But in bourgeois society this is occurring for the most part spontaneously, while the goals are to decrease the expenditures of capital on the output of products and to increase its profitability. But what about the good of society, of man? This question remains outside the purely selfish field of view of corporations.

In case of such an approach the social consequences of automation are frightful for the man of labor. For example, the Italian firm Fiat intends in the next 10 years to replace with "seeing" robots 90 percent of the people who work at its plants. In Japan completely automated plants, which will operate practically without people, will appear already next year. The introduction of microprocessor-based administrative equipment will deprive thousands of clerks of a job. The French Government has published a prediction: the introduction of microelectronics by the end of this century may lead to a decrease of the number of industrial workers by 40 percent and of office employees and engineering and technical personnel by one-third.

Today not only semiskilled, but also highly skilled workers, experienced engineers and even administrators are feeling keenly the reality of unemployment--the capitalist use of automatic machines has struck all the labor strata of bourgeois society. The entire style of their life is being shattered, and everyday consciousness perceives this as a result of the invasion of machines. Seizing such moods, bourgeois philosophers, sociologists and economists are persistently emphasizing the negative consequences of automation and are supercharging gloomy predictions to the fullest.

Scientific and technical progress, K. Marx stressed, is fraught with contradictions. That is why, he said, some people "want to get rid of modern equipment, in order thereby to get rid of modern conflicts." The new spiral of automation on the basis of automation is giving rise to a large number of problems which require not only philosophical interpretation, but first of all

practical solutions. Moreover, such solutions which clear the social horizons and afford unlimited prospects to technical progress and mankind.

Is capitalism capable of this? No, for automation objectively widens the gap between labor and capital. Economists believe that by the beginning of the next millennium in the capitalist countries technological unemployment, that is, unemployment caused by the replacement in production of man by machine, will encompass not longer tens, as now, but hundreds of millions of people.

Only socialism can solves the problems which are connected with scientific and technical progress. Public ownership of the means of production makes it possible to carry out automation systematically, in the interests of all society. Yes, automatic machines are freeing workers and employees in our country as well, but this is not leading to unemployment. Robotics and automated systems are being introduced first of all in those processes, in which physically difficult or dangerous labor predominates, in which it is extremely monotonous and does not enable a person to display fully his capabilities and talents. Not the profit, but the improvement of working conditions, the all-round development of the individual, the flourishing of production and culture of society--these are the goals of automation in our society. Automation first of all increases the productivity of national labor and changes its nature and content. It, in particular, makes it possible to fuse together basic and auxiliary processes, to increase the technological feasibility of production and, hence, to use fully all working time. Versatile assembly lines and the introduction of rotary systems will effect a genuine revolution on assembly lines, will free man from exhausting labor and in the end will improve working conditions.

It is impossible to use new equipment and technology without a thorough knowledge of and the ability to work efficiently with computers and microprocessor-based control complexes. Now about 400 working class occupations already require a specialized--secondary and higher--education. The nature of the management of production is also becoming different. The managers of enterprises and associations should have so broad a knowledge in order to be able to see the prospects of scientific and technical progress and to begin in good time the change of the organization of production.

The future of our industry is being born today. Unlimited prospects are being afforded. And many of them are not the fruit of idle fantasy, but are a reality of everyday life. We have come right up to the line, beyond which qualitative changes, which were prepared by all the preceding development of the country, begin. Precisely they will ensure the access of our society to a higher level of social, economic, scientific and technical progress.

Socialism has all the means to regulate systematically the introduction of the achievements of science and technology and to solve the arising problems for the good of people. In the future the complete automation of production will ensure such an increase of the productivity of national labor, which will make it possible to shorten working time with the simultaneous increase of the material well-being and cultural level of all members of society.
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CSO: 1814/66

GENERAL

IMPROVEMENT OF MANAGEMENT OF SCIENTIFIC, TECHNICAL PROGRESS

Moscow SOVETSKAYA ROSSIYA in Russian 25 Nov 84 p 1

[Article by Academician Ya. Kolotyrkin, Hero of Socialist Labor, director of the Scientific Research Physical Chemistry Institute imeni L. Ya. Karpov: "Technical Progress: The Accelerator of the Future"]

[Text] This folder is always on my worktable, within easy reach. The documents, which lie in it, have been reread repeatedly, many phases are underlined--they served as grounds for thoughts and conclusions. Quite recently there was added to these proofs of the constant concern of the party about the scientific and technical progress of the country another one--the speech of Comrade K. U. Chernenko in the Politburo of the CPSU Central Committee on 15 November 1984. I am waiting impatiently for the time when the folder will be supplemented with the documents of a CPSU Central Committee plenum, which is devoted to the questions of the acceleration of scientific and technical progress and the improvement of its management in all the units of the economy.

We scientists are pleased by how thoroughly and attentively scientific problems and questions of the retooling and development of the national economy are being studied in the party Central Committee and the government of the country. We are feeling the results of this attention in our work and are acquainting ourselves with them through publications in the press. In the same issue of the newspaper, in which the speech of Comrade K. U. Chernenko is published, it is possible to read, for example, about the fact that at the Leningrad Znamya Oktyabrya Association the first section of a versatile automated production system is being put into operations, while at the Rostsel'mash Plant the first section of the renovation of the main conveyor has been completed: now it is ready for the series production of Don combines.

All this is visible steps of scientific and technical progress. And their main significance lies not simply in the automation of processes, the introduction of robots and the assimilation of laser technologies, but in the fact that with each such step our economy gets stronger, the well-being of people increases and the defensive capability of the country increases. But do we realize all this clearly enough?

It is well known that it is not enough to propose an idea. It is necessary for it to find application in practice. And the shorter the path is from its origination to implementation, the more dynamically the economy develops and the more quickly many economic and social problems are solved. Today scientific developments cover the path from the origination of ideas to mass industrial production in 10-15 years. This is intolerably long. It has been calculated that the shortening of the time by a year can provide a saving of nearly 5 billion rubles, while by 1990 it would amount annually to 20 billion rubles.

Scientific and technical progress--the rapid replacement of fixed production capital, the extensive use of automated systems, electronics and robots--is a vital command of our times. It is dictated not only by the rapid shortening of the time of the obsolescence of equipment, but also by the difficult demographic situation of recent years. During the current five-year plan 8 million workers less than during the preceding five-year plan will come into the national economy, while during the 12th Five-Year Plan the increase of the working population will decline even more. Modern highly efficient machines and devices and advanced technologies should fill this gap. The decrees of the party and government of recent years insistently remind us of this.

Scientific and technical progress. Unfortunately, like many others, this expression--a vigorous, capacious one--has been worn thin by frequent use and has lost the former tension and significance. Perhaps, that is why at times they have begun to understand by it not entirely what it implies. How often one has occasion to hear: "Scientific and technical progress changed the face of the enterprise." Take a look, indeed, in place of machine tools, which long ago served a century, they have installed new ones. But what kind! Those which you would not call the latest word of technology. Industry still continues to produce them, but there are already others, with significantly greater possibilities and better productivity, which take into account the questions of automation, the scientific organization of labor and the protection of man's health and the environment.

It would seem, what could be better? But the enterprise does not take them. There are many reasons here, we will yet speak about them, but here is one of them: it is necessary to make not only a new base for such machine tools. Modern equipment often requires the reorganization of all production, the elimination of bottlenecks, the complete rejection of manual operations and the increase of the standards of labor. Moreover, not in words, not in reports, but in deed. Because otherwise these machine tools either will not yield the impact, for which they were designed, or--which is not a rare thing--will not be able to operate at all. The enterprise takes what is simpler, if only there is a little less trouble.

But is it possible to call this technical progress? Of course not! Progress is continuous movement, the constant search for and assimilation of what is new and better. Without this any results, any indicators, no matter how high they seem, will be only a pale shadow of what could have been achieved.

Do production workers understand this? For their most part they do. And still they remember the achievements of scientific and technical progress last

of all, when, as they say, there is nowhere to go. Those who, like me, have devoted their entire life to science, are well acquainted with similar situations. It happens that you sweat over some problem, successfully solve it, see that it can yield a practical impact, rush to the production workers and suddenly find yourself in the role of a tiresome petitioner. But this is nonsense! A processing method or unit has been developed, which is of benefit to the enterprise, its consumers and in the end the state, but it turns out in such a way that you worry about your own advantage.

Here is a fresh example. The technology and a unit for the impregnation of wood items with organic compounds--monomers--with subsequent treatment with gamma rays have been developed at our Scientific Research Physical Chemistry Institute imeni L. Ya. Karpov. After such treatment the wood becomes much stronger and more durable. For example, from soft species of trees by means of this method it is possible to obtain parquet, which in its qualities is not inferior to oak parquet. It was decided to introduce this method at the Petushki Spool and Bobbin Factory in Vladimir Oblast. Our specialists undertook to help build a unit there. But it will soon already be a year that consultations of various kinds, which reveal the obvious lack of interest in the innovation of both the enterprise and the main administration, to which it is subordinate, have been going on. And this is in spite of the fact that its introduction promises to increase the service life of the parts of the attachments of the looms by several times!

Why is it happening this way? I have already had occasion to write and speak repeatedly on this theme. The main reason, in my opinion, lies in the existing practice of planning and the system of the evaluation of the economic activity of enterprises. They are forced to concentrate all efforts on the fulfillment of intensive plans. At times the production workers are left with neither the strength nor the assets for worries about tomorrow, about the improvement of production technology and about the increase of product quality. Frequently one has occasion to come across such a situation, when the production capacities of an enterprise are loaded to such an extent that it has no time to perform even preventive maintenance. The equipment operates literally until worn out. But meanwhile it is well known that no system can operate reliability without a certain reserve of capacity.

Of course, the plan must be fulfilled. But it should not be an independent self-sufficing category which comes into conflict with the interests of the state and consumers. But here is what is noteworthy: precisely these interests are the main argument of planning organizations. When we say (while being concerned about the same consumers) that it is necessary to introduce some advanced processing method, which will make it possible to produce a qualitatively new type of product, which satisfies the latest requirements, for this it will be necessary to reduce for a time the output of items, at times they reply to us: you see what a great need there is for these items, at present we do not have time for diversity, for refinement, the main thing is to meet the needs of people. It seems that it is no use objecting. But look at the shelves of stores, which are packed with models of footwear, televisions and washing machines, which hardly anyone needs, at plant yards, which are filled with equipment, which has not been sold due to imperfection

or obsolescence, and you will understand that concern about the interests of consumers and the state is at best self-deception.

Here is to what aspect of the matter I would still like to direct attention. Although they assign it to the category of subjective ones, at times it is no less important than the basic principles. It is a question of the attitude of managers, scientists and workers, in short, of each of us toward the problems of scientific and technical progress. It goes without saying that it is difficult today to introduce a new development, the factors, which have already been spoken about, interfere. But, it happens, you will meet a manager, will acquaint yourself with the affairs of the collective which he heads, and the feeling is left that there are no problems here. Questions are settled competently, quickly and with an interest. Reasonable ways of overcoming difficulties are found. But everything is because the people here are aimed at searching and think in a state manner, on a large scale and maturely.

Such people were found by us at the plant of automotive and tractor light fixtures in Kirzhach of Vladimir Oblast, at the Pavlodar Aluminum Plant and several other enterprises, where they introduced quickly, without delays the economical processing methods suggested by us. Unfortunately, there are not that many examples of this sort. Quite a few managers are drawn to what is customary and adjusted, while they have a kind of allergy to what is new. As soon as you start a conversation on this, then and there the person's mood is spoiled, thousands of excuses and "objective" reasons are found: things are bad with personnel, the transportation workers are letting us down, there are troubles with the suppliers. You listen to such a person and think in a fit of anger: "They are letting you down because such managers as you sit there!"

Of course, much also depends on the creative output of scientists themselves. And it, as is known, depends on how interested each associate of the scientific collective is in the maximum efficiency of his own labor. And on the extent to which this interest is supported by moral and, what is no less important, material stimuli. A new system of the remuneration of the labor of scientific associates, which received the name "the Karpov system," was adopted as an experiment at our institute 16 years ago. The experiment was successful. Owing to it we obtained the opportunity to increase or decrease the wage of an associate subject to his real output, which is periodically evaluated by the certification commission. The new system made it possible to solve many sore problems for scientific organizations: to eliminate the inordinately large gap between the salaries of young capable personnel and experienced scientists with degrees, to get rid of negligent associates, to avoid the inclusion in plans of minor, unpromising themes and so forth. Several tens of institutes have already changed over to "the Karpov system." It seems that the work in this direction must be continued. This is one of the conditions which will make it possible to speed up the development and introduction in production of new types of machines and equipment and to increase the scale of the introduction of advanced processing methods and the updating of products, to which Comrade K. U. Chernenko directed attention in his speech at the meeting of the Politburo of the CPSU Central Committee on 15 November 1984.

We scientists fervently support the decision of the Politburo, which deemed it necessary to examine at the next CPSU Central Committee plenum the questions of the acceleration of scientific and technical progress and the improvement of its management in all the units of the economy. We are confident that the decrees adopted at it will create the real prerequisites for a radical change in this vitally important direction of our development.

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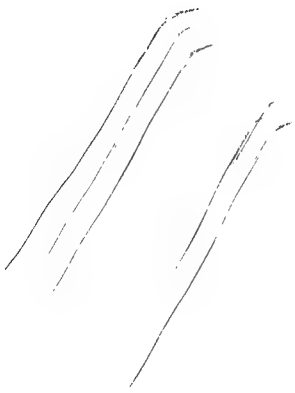

GENERAL

TASKS OF SCIENCE, TECHNOLOGY IN FULFILLMENT OF 1985 STATE PLAN

Moscow PRAVDA in Russian 19 Dec 84 p 1

[Article: "Science and Technology for the Five-Year Plan"]

[Text] The fourth year of the five-year plan was marked by considerable scientific and technical achievements in practically all the sectors of the national economy. In 1984 about 4,000 models of new types of machines, equipment, apparatus, instruments and means of mechanization will be developed. New mechanized flow and automatic lines, robotic complexes, automated systems for the control of technological processes and other promising units are being introduced. All this is a result of the persistent work of the party on the intensification of the economy and of the significant contribution of the army of innovators to the matters of the improvement of equipment and production technology and the better organization of labor and management.

"...In our times the basis of efficient development is the extensive introduction of the achievements of science and technology in production," Comrade K. U. Chernenko noted. The USSR State Plan of Economic and Social Development for 1985, which was approved by the USSR Supreme Soviet, is oriented toward the acceleration of scientific and technical progress, the intensification of the economy and the worthy conclusion of the 11th Five-Year Plan. Party and trade union organizations and economic managers need to aim the efforts of the collectives of enterprises and construction projects, scientific research and design institutions at its unconditional fulfillment.

The assimilation of new types of machines, equipment, instruments, materials and advanced technological processes is planned on a significantly greater scale as compared with this year. The use of resource-saving processing methods, such as the continuous teeming of steel, the production of cement by the dry method, the thorough refining of petroleum and gas and the complete utilization of raw materials, will be broadened. The output of NC machine tools, robotized press complexes, machines and units for the mechanization and automation of materials-handling, loading and unloading and warehouse operations will increase. The placement into operation of automated systems for the control of technological processes and computer control complexes will increase sharply. Advanced equipment and technology will make it possible to free conditionally in industry about 800,000 people, to shift approximately

400,000 people from manual to mechanized labor and to save about 5 billion rubles. Basic research--the scientific reserve for the 12th Five-Year Plan and the long-term future--will be expanded.

Against such a background the cases of the upsetting of the fulfillment of the assignments on the introduction of new equipment and technology in production look especially intolerable. Among those lagging the most in this area are the USSR Ministry of Power and Electrification, the Ministry of the Petroleum Industry, the USSR Ministry of the Petroleum Refining and Petrochemical Industry, the USSR Ministry of Ferrous Metallurgy and the Ministry of the Chemical Industry, which were justly criticized at the recently held session of the USSR Supreme Soviet. Ministries and departments at times with a great delay report the assignments on the introduction of the achievements of science and technology to the performing organizations and do not always supply them with the necessary financial and material resources.

Great and diverse tasks are posed by the state plan for the sectors, their enterprises and scientific institutions. However, there is one common task, it is to manage better, to zealously save material, including fuel and energy, resources. In past years the assignments on the decrease of the material expenditures were frequently upset. Meanwhile the reserves of their saving are quite large, to which the initiative of the leading collectives of Moscow, the Ukraine and the Urals, which proposed to create a fund of the above-plan saving at every enterprise, in every oblast, kray and republic, attests. At many enterprises the decision has already been made to operate 2 days a year on the saved materials, raw materials and fuel. Inventors and efficiency experts, undoubtedly, will aid the fulfillment of these obligations. The saved assets will be used for social needs, first of all the improvement of the medical service of the population.

The efficient use of labor and the increase of its productivity require special attention. Here a great role belongs to the certification of workplaces, which fundamentally also includes the drive for the organizational and technical improvement of production. The experience of the Dnepropetrovsk Combine Plant, which was endorsed by the party Central Committee, is well known. Here at the same time as the certification of the workplaces their rationalization was also carried out, which contributed to the more efficient use of production capacities and the increase of labor productivity. The modernization of workplaces is becoming more and more widespread. It is important for sectorial scientific research institutes, the organizations of scientific and technical societies, inventors and efficiency experts to take an active part in this great and important matter.

The increase of product quality, the productivity and reliability of machines and sets of them and the quality factor of materials and items requires the constant efforts of scientists, specialists of scientific research institutes and design bureaus and production innovators. The most significant achievements in this matter should become a subject of zealous care on the part of the USSR State Planning Committee, the State Committee for Science and Technology, the State Committee for Inventions and Discoveries, ministries and departments.

Innovators are also capable of much in the area of the supply of the population with consumer goods. At a recently held conference in the CPSU Central Committee it was noted that individual ministries are inadequately using their scientific and technical potential for the expansion of their output. The labor collectives of enterprises should put their reserves to use in order to supply trade organizations with diverse, high quality consumer goods.

In the coming, final year of the five-year plan it is planned to continue even more vigorously to improve management and the entire economic mechanism, which also directly affects the acceleration of scientific and technical progress.

The enormous tasks facing the national economy require the constant attention of the party committees, the soviets of people's deputies and trade union and Komsomol organizations. Their duty is to mobilize labor collectives for the campaign for the increase of the efficiency of production, its intensification, the acceleration of scientific and technical progress, assiduous management and the successful fulfillment of the plans of 1985 and the five-year plan as a whole.

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CSO: 1814/64

GENERAL

INCREASE OF YIELD OF SECTORIAL SCIENCE

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 5 Jan 85 p 2

[Article by Candidate of Technical Sciences A. Dzhanoyan, senior scientific associate of the Economic and Technical Information Division of the USSR Ministry of the Electrical Equipment Industry (Moscow): "Sectorial Science and Its Yield"]

[Text] Continuous experimental research, during which the most effective forms and methods of the management of scientific and technical progress of the sector are identified, is being conducted in the electrical equipment industry. And this is having a positive effect on the overall results of work. In the past 4 years alone the number of workers at sectorial scientific research institutes and design bureaus has decreased by 4 percent. At the same time the national economic impact from the introduction of new equipment during the current five-year plan will come to not less than 7 billion rubles, which is 6.5-fold more than 10 years ago.

The comprehensive quality control system, which originated in the sector, had an appreciable positive influence on this process. In recent years the certification of the level of the technology and organization of production has become a complement of this system. Its results serve as a guideline of the retooling of enterprises and directly influence the evaluation of the quality of the output being produced.

The system of the comprehensive planning of scientific research and experimental design operations on the basis of supply orders has also justified itself. It ensured the continuity of the "science--technology--production" cycle. A precisely developed procedure of planning, in case of which the amount of operations in accordance with the products list, which have been completely finished and turned over to the client, became the basic assignment of scientific research institutes and design bureaus, supplements it. This makes it possible to evaluate the activity of scientific research institutes and design bureaus not according to the total expenditures, but according to the end result.

The approval of the special sectorial standard "The Development of Science and Technology. Planning" was an important step toward the goal. It obliges researchers, designers, process engineers and production workers to work,

figuratively speaking, in one team at the earliest stages of the development and introduction of new items, including the technological preparation of production.

During the 11th Five-Year Plan the comprehensive program of the saving of material and manpower resources was fundamentally added to the mechanism of the management of sectorial science and technology. It directs the attention of every main scientific research institute to the development of light-weight components, the introduction of low-waste and waste-free technology, the automation and mechanization of labor and the increase of the level of the organization of production. An effective set of stimuli of the creative contribution to scientific and technical progress was also developed. In the sector there are now two basic sources of the material stimulation of the developers and producers of new equipment. One is dependent on the real national economic impact which was obtained at the enterprise from the decrease of the cost of the output being produced by means of the use of technical and technological innovations. The other is at the expense of the economic impact for the consumer, owing to the markup on the wholesale price of products of the highest quality category.

All this is becoming an integral part of the system of sectorial management and is yielding a substantial impact. And all the same it cannot but be admitted that the technical level of a number of items and the time of the assimilation of new equipment do not yet meet the increased requirements.

Here, for example, more than 10 years ago the All-Union Institute of Transformer Building developed for production at the Minsk Electrical Equipment Plant imeni V. I. Kozlov transformers with wound magnetic cores. Similar items, but of a different size, in accordance with developments of the Yerevan VNIIKE [not further identified] were intended for assimilation at the Armelektromash Production Association. Years passed. But the equipment was introduced to the extent of only 10-15 percent. The poor preparation of production, the lack of free areas and the inadequate responsibility of those, to whom introduction was entrusted, had an effect. In all in 3 years of the 11th Five-Year Plan approximately 20 percent of the developed machines, apparatus and instruments have not reached production. It is necessary to state that the economic mechanism of the assimilation of new equipment has not yet been completely adjusted, it has not yet been possible to achieve the proper interest of all the participants in this process.

As is known, the price is the most important tool of such a mechanism. Now it is seen that it is being used inadequately. Practical experience shows that the existing markups on the wholesale prices for products of the highest quality category are too small and are in effect briefly--only 2, at the outside 3 years, until the recertification of the item. This objectively prompts the designer or process engineer to leave "a reserve for modernization." Moreover, if a new item again receives the Emblem of Quality, the enterprise all the same does not have a markup. Thus, the consumer derives all the benefit, while the developer and producer are left, as they say, with their own interest, being deprived of the basic source of the formation of the material incentive fund.

It seems that one must not approach the concept "new equipment" abstractly or link it with the time of origination. This concept should be applied to any item or technological process regardless of the term of its life, but only if they retain the highest quality category. And the markup on the wholesale price should be in effect regardless of the age of items. But it should apply both to a product, which has been developed for the first time, and to the one which has been produced for a number of years, but continues to satisfy the greatest requirements. The Emblem of Quality should be the only condition of the effect of the markup.

In order to interest the developer in the use of all scientific and technical achievements, it is necessary to guarantee him the size of the markups as a specific percentage of the wholesale price of the item. This percentage, in our opinion, should be differentiated by groups of items and should be approved for the entire term of effect of the standard of the markup. In this case with the awarding to an item of the Emblem of Quality the markup on its price will automatically take effect. And vice versa: the cancellation of the Emblem of Quality will terminate the effect of such a markup. The divide between the plan of new equipment and the plan of basic production will disappear by itself, the common interest of scientific research institutes, design bureaus and enterprises in a high technical level of products and their quickest assimilation will increase.

Of course, the question of a new approach to the evaluation of the technical level and quality of items arises. First of all the need has arisen to increase sharply the responsibility of the main scientific research institutes and sectorial certification commissions for the competent and comprehensive evaluation of all the merits and drawbacks of the item being certified. In such an evaluation it is important to take into account the prospects for one product or another, the efficiency of its production and of its use by the consumer. Today the parameters of the All-Union State Standards are a rejection tag for products, which prohibits their production. It seems advisable to have in the All-Union State Standards two lines of indicators and characteristics--top and bottom. Certification for the highest category should be carried out according to the top line of indicators, which should correspond to or exceed the world level.

Unfortunately, the system of the evaluation of the degree of the mechanization and automation of labor, which is now in effect, is a hindrance to technical progress in production. The point is that instructions, in accordance with which the ratio of those working with the help of mechanisms to the total number of workers is taken as the basis, have been approved by the USSR Central Statistical Administration. And it turns out that the more people there are at mechanisms--even though they are technically outdated--the better the indicator of the enterprise is. Given such a calculation even the most outdated works can look advanced and vice versa. With the introduction of automated equipment and versatile automated production systems the relative number of manual workers--adjusters, repairmen--increases. It is not difficult to imagine that at the ideal, completely mechanized enterprise the degree of mechanization in case of such a calculation will be equal to zero. It seems that here the assignment on the absolute reduction of the total number of personnel without division into the basic and auxiliary categories

and other categories, which were contrived at one time, should become the criterion of evaluation.

The conditions of the large-scale experiment are making it possible to verify more accurately the effectiveness of the entire set of measures for the increase of the efficiency of sectorial science. Its yield will increase, if the State Committee for Standards, the State Committee for Science and Technology, the USSR State Committee for Prices and the USSR State Planning Committee properly take part in the matter. Their position in many ways will determine how accurately all the progressive aspects of development are taken into account.

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CSO: 1814/64

GENERAL

CONFERENCE OF PARTY EXECUTIVES, MANAGERS OF AGRICULTURAL MACHINERY PLANTS

Kiev PRAVDA UKRAINY in Russian 20 Nov 84 p 3

[Article (RATAU): "On the Basis of Scientific and Technical Progress"]

[Text] The questions of the further intensification of production and the social development of collectives on the basis of scientific and technical progress, the tightening up of the policy of economy and the use of the experience, which was approved by the CPSU Central Committee and the Ukrainian CP Central Committee, of leading enterprises, first of all the Dnepropetrovsk Combine Plant imeni K. Ye. Voroshilov, the Kiev Combine Plant imeni Lepse and the Kiyevtorgmash Production Association, were examined at the seminar conference, which was held in Kiev, of the secretaries of the party organizations and the economic managers of the enterprises of the Ministry of Tractor and Agricultural Machine Building, which are located in the republic.

The means of increasing production efficiency and the technical level and quality of products and decreasing the specific expenditures of manpower, material, fuel and energy resources, the untapped reserves for the fulfillment of the plans of the current five-year plan and the preparation for the accomplishment of the increasing tasks of the next five-year plan were spoken about in the report of Deputy Minister of Tractor and Agricultural Machine Building G. S. Kirichenko and the statements of General Director of the Kiyevtraktordetal' Association V. F. Zlobin, Academician of the Ukrainian SSR Academy of Sciences N. G. Chumachenko, Secretary of the Party Committee of the Dnepropetrovsk Combine Plant V. A. Bugayev and other participants in the seminar conference. Much attention was devoted to the development and the assimilation of the production of new highly efficient equipment for the countryside and to the increase of its output, first of all for industrial and intensive techniques of the cultivation of grain crops, including corn, as well as technical and other crops.

Candidate Member of the Politburo and Secretary of the Ukrainian CP Central Committee Ya. P. Pogrebnyak spoke at the seminar conference. He dwelled on the basic tasks of the party organizations and collectives of enterprises, scientific research and planning and technological institutes and design bureaus on the worthy greeting of the 27th CPSU Congress. It is necessary to focus their efforts on the improvement of the use of the production potential, the assurance of the increase of labor productivity, the further improvement

of production and management and the introduction of the achievements of science and technology. The tightening up of the monitoring of the fulfillment of the decrees of the CPSU Central Committee and the Ukrainian CP Central Committee on these questions and the improvement of organizing and ideological work, the selection, placement and training of personnel were discussed.

The need for serious preparation for the changeover of the sector to work under the conditions of the economic experiment was indicated. The measures on the increase of the economic independence and responsibility of enterprises should be aimed at the increase of the interest of collectives in the introduction of new equipment and the rapid assimilation of production capacities and at the transformation of the production development fund into the basic source of the performance of work on renovation and retooling. For the improvement of the living conditions of workers it is necessary to use more efficiently the funds which are envisaged for sociocultural and housing construction. The new conditions require the more extensive participation of collectives in the drafting of production plans and the increase of the mutual responsibility for the fulfillment of contractual obligations on deliveries of products and allocated resources. While noting the positive results in this work, those who spoke at the same time expressed critical remarks meant for individual managers and party committees.

The drafts of the plan-measures of enterprises for the next five-year plan on the intensification of production and the social development of collectives, the acceleration of retooling and the expansions of the operations, which are performed with their own resources, were also examined. The need to concentrate efforts on the fulfillment of the specific tasks, which follow from the decisions of the October (1984) CPSU Central Committee Plenum and of the Politburo of the CPSU Central Committee, which examined the drafts of the USSR State Plan of Economic and Social Development and the USSR State Budget for 1985, the speeches of Comrade K. U. Chernenko and his instructions on questions of the further development of the economy, was emphasized. Great speed, the increase of production efficiency and the good quality of items should become the basic rule of the work of every enterprise and a norm of the labor of every worker.

The participants in the seminar conference acquainted themselves with the experience of work on the intensification of production and the social development of collectives of the Kiyevtorgmash Production Association and the Plant imeni Lepse, as well as with developments of scientists at institutes of the Ukrainian SSR Academy of Sciences--the Institute of Electric Welding imeni Ye. O. Paton, the Institute of Cybernetics imeni V. M. Glushkov, the Institute of Superhard Materials and the Institute of Casting Problems.

Chief of the Agricultural Machine Building Department of the Ukrainian CP Central Committee Yu. A. Bondar', responsible official of the CPSU Central Committee G. I. Vazhenin and First Deputy Chief of the Organizational Party Work Department of the Ukrainian CP Central Committee Yu. D. Stetsenko took part in the work of the seminar conference.
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GENERAL

DONETSK SEMINAR ON PARTY INFLUENCE ON WORK OF SCIENTIFIC COLLECTIVES

Kiev PRAVDA UKRAINY in Russian 23 Dec 84 p 3

[Article (RATAU): "Increase Party Influence on the Work of Scientific Collectives"]

[Text] A seminar of the secretaries of the party organizations of scientific institutions of the Ukrainian SSR Academy of Sciences and the republic Ministry of Health was held in Donetsk on 21-22 December.

Candidate Member of the Politburo and Secretary of the Ukrainian CP Central Committee A. S. Kapto delivered a report on the work of the party organizations of scientific institutions on the successful completion of the 11th Five-Year Plan and the worthy greeting of the 27th CPSU Congress.

In analyzing the main directions of the implementation of the unified scientific and technical policy in the republic, the speaker revealed the best experience of work of the primary party organizations on the increase of the efficiency of scientific research and devoted particular attention to the implementation of its results in the national economy and the stepping up of the participation of scientific collectives in the formulation of scientific and technical programs for the 12th Five-Year Plan.

In the report important questions of the increase of party influence on the connection of science with production were raised and the need for the dynamic development of the creative cooperation of scientists and production workers and the improvement of the forms of this work was reflected.

Scientists of the republic are making a large contribution to ideological work and the scientific methods support of aggressive counterpropaganda. A. S. Kapto summarized some results of the elaboration by social scientists of urgent theoretical problems and revealed specific means of increasing their role in the improvement of political educational work in the republic. Much attention was devoted to the ideological educational aspects of the activity of party organizations directly in scientific collectives. It was stressed that all these questions are acquiring particular importance in connection with the forthcoming 27th party congress, which will adopt a new version of the CPSU Program.

While revealing the tasks in the area of organizational party activity, the speaker showed the increase of the role of primary party organizations as organs of political leadership locally. The purposeful implementation of a modern personnel policy is a guarantee of the successful achievement of the socioeconomic and educational goals. He revealed the existing shortcomings, singled out the unsolved problems and analyzed specifically and thoroughly the means of increasing the pugnacity of party organizations and improving the style and methods of their work.

Secretary of the Oblast Party Committee G. P. Yerkhov reported on the forms of the party supervision of the development of science and technology in Donetsk Oblast. He reported that a system of the territorial management of scientific and technical progress, which was established with the participation of party committees, has been developed and is being successfully implemented in this most important industrial region of the republic. More than 100 scientific research institutes, higher educational institutions, planning and design and technological organizations and 127 enterprises, associations and institutions are taking part in the implementation of programs of various levels.

Academician of the Ukrainian SSR Academy of Sciences K. M. Sytnik, vice president of the Ukrainian SSR Academy of Sciences, devoted his report to the work of scientists of the Ukrainian SSR Academy of Sciences on the intensification of scientific research and and the acceleration of the use of its results in practice. He dwelled in detail on the basic tasks of the institutions of the Ukrainian SSR Academy of Sciences on the assurance of the successful fulfillment of the plans of the 11th Five-Year Plan, the increase of the contribution to the effective solution of difficult national economic problems and the improvement of ideological and political work.

Chief of the Organizational Party Work Department of the Ukrainian CP Central Committee G. K. Kryuchkov in his statement dwelled on the urgent questions of organizational party work and the increase of party influence on the activity of scientific collectives.

Deputy Chairman of the Ukrainian SSR State Planning Committee V. N. Khalapsin and Ukrainian SSR Deputy Minister of Health P. G. Otroshchenko spoke at the seminar. V. P. Kitayev, a lecturer of the Propaganda Department of the CPSU Central Committee, gave a lecture on the international situation.

An exchange of the experience of party work took place in the sectional work. The seminar participants acquainted themselves with the work of a number of scientific, production and medical organizations and institutions of Donetsk.

Member of the Politburo of the Ukrainian CP Central Committee and First Secretary of the Donetsk Oblast Party Committee V. P. Mironov, Ya. I. Azhipa, a responsible official of the CPSU Central Committee, Chief of the Science and Educational Institutions Department of the Ukrainian CP Central Committee F. M. Rudich and responsible officials of the Ukrainian CP Central Committee and a number of oblast and city party committees took part in the work of the seminar.

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CSO: 1814/63

GENERAL

ACADEMICIAN PATON ON ACHIEVEMENTS OF UKRAINIAN SSR STATE PRIZE WINNERS

Kiev PRAVDA UKRAINY in Russian 25 Dec 84 p 3

[Article by President of the Ukrainian SSR Academy of Sciences Academician B. Ye. Paton, twice Hero of Socialist Labor, chairman of the Ukrainian SSR Committee for State Prizes in Science and Technology attached to the Ukrainian SSR Council of Ministers: "In the Service of Progress"]

[Text] The achievements of scientific thought, which have been embodied in the modern designs of machines and instruments, in new materials, advanced technologies and methods of the organization of labor, in our times are becoming the main source of the intensification of social production and are decisively influencing the quality of the output being produced. The works, which were awarded this year the Ukrainian SSR State Prizes in Science and Technology, are an example of this.

Scientists of the Institute of Problems of Machine Building of the Ukrainian SSR Academy of Sciences and Kharkov Polytechnical Institute for a long time have been cooperating fruitfully with enterprises of power machine building of the country. Original designs of blade systems, impellers and other units of steam and hydraulic turbogenerator units have been proposed on the basis of basic research. It was possible to develop power plants of a large unit capacity, which are distinguished by great reliability and economy.

We do not cease to admire the efficiency and coordination, with which collectives are working on the construction of petroleum and gas pipelines. This became possible owing to the scientific organization of labor and the material and technical supply of construction projects in accordance with the methods of cyberneticists. What is their advantage? The losses of resources have been eliminated, the main pipelines are being put into operation strictly in accordance with the schedule. The names of those, who developed and introduced the optimum approaches to the organization of operations at the construction site of the main petroleum and gas pipelines, were given among the prize winners.

Physicists conducted basic research in order to reveal the nature of the thermoelasticity of metals and alloys. Scientists made the outstanding discovery of the phenomenon of superelasticity and the remembrance of shape in materials. New alloys, parts made from which are capable of restoring their

shape upon heating, were developed on the basis of this discovery. Such materials are revealing new possibilities of modern technology and, in particular, instrument making.

Scientists of the Institute of Geophysics imeni S. I. Subbotin of the Ukrainian SSR Academy of Sciences enriched our knowledge with new information on the structure of the earth's crust on the territory of the Ukraine and the regions adjacent to it. The work, which was awarded the Ukrainian SSR State Prize, is of great practical importance--for the determination of the general strategy of the search for minerals, making it possible to conduct geological prospecting more effectively.

The joint research of historians of four union republics, who studied the relations of the Russian, Ukrainian, Belorussian and Moldavian peoples, received a high appraisal. Against a broad historical background, on the basis of specific materials the roots and sources of the truly inviolable friendship of the fraternal peoples and their achievements in the building of socialist and communism were shown from the standpoint of Marxist-Leninist methodology, the role of the Communist Party in the founding and strengthening of our multinational state was emphasized.

The achievements of gerontologists, now prize winners, who are supervised by Academician of the USSR Academy of Medical Sciences Dmitriy Fedorovich Chebotarev, have become well known in the world. Their recommendations to practitioners are making it possible to treat elderly people more effectively and to extend their ability to work.

The scientists of the Institute of Electric Welding imeni Ye. O Paton of the Ukrainian SSR Academy of Sciences and specialists of a number of enterprises of the republic made a significant contribution to the development of machine building, a sector which governs the rate of acceleration of scientific and technical progress in the national economy. New progressive technology is making it possible to produce entire parts of machines by the methods of electroslag casting. Labor productivity increased, the consumption of alloyed steel was decreased, the reliability of equipment was increased.

Annually the capacities of enterprises of the wood processing industry are increasing, the quality of items made from wood and wood materials is improving. In this is the great service of scientists and specialists, on whom lofty awards have been conferred for the development and introduction of new types of abrasive tools and technology for the sanding of wood surfaces.

In our country the output of systems of automatic equipment and computers, which are distinguished by great complexity, is increasing. Automated diagnostic complexes have been developed for the purpose of decreasing the labor expenditures on production and adjustment, as well as on maintenance. They increase labor productivity in instrument making and the reliability of items of electronics and help to quickly find and eliminate malfunctions in operation.

Among the prize winners there are also engineering and technical personnel, who developed a unit for the protection of the air basin from discharges of

the ore smelting furnaces at the Nikopol Ferroalloy Plant. If only such an indicator: 99.9 percent of the discharges of dust are caught, can attest to the efficiency of the operation of the unit. But these discharges in the recent past came to about 18 tons a day. The escape of ferroalloy gas has also been reduced to a minimum. Thus, along with the solution of the problems of protecting the environment and improving working conditions the task of developing and using a low-waste and energy-saving processing method in metallurgical production was accomplished.

The work of the scientists and specialists, who actively participated in the accomplishment of the practical tasks of the Food Program and, in particular, the development of animal husbandry and the increase of its productivity, was appreciated. A new plant type of meat hogs was developed. The bred animals grow quickly and are distinguished by high daily weight gains.

Scientists of the republic Academy of Sciences and sectorial research institutions and specialists of agriculture proposed and introduced extensively at farms of Dnepropetrovsk Oblast a new technology of producing a liquid whole milk substitute for raising young agricultural animals. The economic impact during the past 2 years came to more than 30 million rubles.

Students of the second and third grades of the general educational school received the good textbooks "Prirodovedeniye" [Natural History]. According to the testimony of teachers and scientists, the children are successfully learning the educational material, a materialistic world outlook and communist conviction are being formed in them. The books satisfy the present demands which are being made on educational literature in connection with the reform of the general educational school, which is being carried out.

The State Prize was also awarded to a group of well-known legal scholars, who wrote for higher educational institutions the textbook "Sovetskoye grazhdanskoye pravo" [Soviet Civil Law]. The great demand of not only law students, but also a broad group of legal personnel attests to its popularity.

I would also like to direct attention to the composition of the authors of the works to which the prize was awarded. As in past years, among the prize winners there are representatives of scientific institutions, enterprises and organizations of Moscow, Leningrad and other cities of the country. This attests to the close creative contacts of scientists and specialists, the increasing scale of the introduction of the operations, which were performed in our republic, the truly fraternal friendship of the peoples of the Soviet Union and their common concern about the further development of the economy, the strengthening of the defensive might of the homeland and the increase of the well-being of the Soviet people.

The scientists and specialists of the republic are fully resolved to implement the constructive program, which was outlined by the 26th party congress, the subsequently decrees of the CPSU Central Committee plenums and the instructions and recommendations, which are contained in the speeches of General Secretary of the CPSU Central Committee and Chairman of the Presidium

of the USSR Supreme Soviet Comrade Konstantin Ustinovich Chernenko. Examples of this are the achievements of the winners of the 1984 Ukrainian SSR State Prizes in Science and Technology.

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